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JOURNAL OF THE PROCEEDINGS

OF THE

LINNEAN SOCIETY OF LONDON.

Contributions to the Orchidology of India.—No. II.

By Professor Lindley, F.R.S., F.L.S., &c.

(Continued from vol. i. p. 190.)

[Read March 4th, 1858.]

Dendrobium, *Swartz*.

This great Indian genus varies extremely in the habit of its numerous species,—some being little larger than the mosses among which they grow, while others are surpassed in stature by few of the Order. Like the *Oncidia* of the New World, there are some species of which the foliage is ancipitous, others having it terete, while in the majority it is in the usual flat condition. A few have no other stem than a wiry creeping rhizome; others have small conical pseudo-bulbs; many form clavate horny stems, leafy only at the summit; but the greater part produce long leafy branches. In the majority the colour of the flowers is some shade of purple; a few are destitute of all colour except green; and a rather considerable group is especially distinguishable by the rich yellow tint of their blossoms. Of such distinctions advantage has been taken in the following sketch of the entire genus, now consisting of more than 200 species, of which I have examined the larger part. In this all the species agree, that there are only four pollen-masses, nearly equal in size, and of uniform breadth at either end. On the contrary, the *Erias*, which in some cases have been mistaken for *Dendrobium*, have the pollen-masses pyriform, so that when, in the

herbarium, a specimen has lost a part of its pollen-masses, as is frequently the case with *E. muscicola*, *Dalzelli*, &c., its true genus may still be determined. It is mainly because *Sarcostoma* has the pyriform pollen-masses of an *Eria*, although their number is that of *Dendrobium*, that I now hesitate to reduce it to the latter genus.

In forming the sections now proposed, it will be seen that a regular sequence of the most nearly allied forms is not wholly obtained. However desirable, indeed, such an arrangement may be in theory, it is certainly unattainable in practice in cases where great numbers of species are brought together; for the points of resemblance and difference are so various and complicated, that, like countries in a geographical map when placed in a continuous series, some must of necessity be dissevered from those to which they are conterminous in nature. Thus the *Bolbodia*, forming a natural group among each other, run into *Stachyobium* as much as into *Eudendrobium*, next which the section is placed; and such species as *D. Dalhousieanum* are much allied to the Holochrysals. It would, moreover, be desirable to collect into one subdivision such species as *D. excisum*, *metachilinum*, *Tmesipteris*, *lycopodioides*, &c., now forming a part of *Eudendrobium*; but I do not at present see what combining characters are available for the purpose.

The following Table brings into one view the distinctions of the groups under which the annexed memoranda are collected:—

Folia verticalia (scalpellifolia) .... 1. APORUM.
—— teretia .... 2. STRONGYLE.
—— horizontalia.
Caulis nullus, rhizoma tantum .... 3. RHIZOBIUM.
—— apice tantum 1–3-phyllus. Folia coriacea... 4. DENDROCORYNE.
a. **labello continuo.**
b. **labello in crinibus soluto (*Desmotrichum*).**
Caulis undique foliatus:
Flores omnino aurei .... 5. HOLOCHRYSA.
—— rosei aut candidi, labello tantum quandoque luteo.
Mento nullo .... 6. ACLINIA.
—— producto:
Flores fasciculati aut solitarii:
a. **Caule brevissimo, conico (*Bolbodium*).**
b. **Caule elongato** .... 7. EUDENDROBIUM.
Flores dense racemosi, mento elongato 8. PEDILONUM.
Flores laxe racemosi, mento brevi:
petalis conformibus .... 9. STACHYOBIUM.
petalis elongatis spathulatis ....10. CERATOBIUM.

§ I. APORUM, *Blume*.

The ancipitous leaves clearly distinguish this group from all other Dendrobia. The genus *Oxystophyllum* differs in nothing except having only two globose pollen-masses instead of four. *D.* (Aporum) *sinuatum* of the 'Bot. Register, 1841, Misc. No. 3,' which has quite the habit of *Ox. carnosum,* seems to connect the two genera; for although it has four pollen-masses, two are much smaller than the others, as if rudimentary*.

* *Flores terminales et laterales. Caules apice sæpe aphylli.*

72. **D. (A.) micranthum** (*W. Griffith, in Calcutta Journal of Natural History*, iv. 376; *Ib.* v. 369).
Java, *T. Lobb.*

His erroneous description of the lip of this plant was corrected by Griffith in a later paper: the specimen in my herbarium which I refer to here differs in the lip being too broad to be called "linear-oblong"; but I have seen nothing else to which Griffith's description will apply.

73. **D. (A.) Serra,** *Lindl. Gen. & Sp. Orch.* No. 5.
Java, *T. Lobb.* in hb. Hooker.

A flower in the Hookerian Herbarium shows this to be the *Macrostomium aloifolium,* Blume, which is confirmed by one of Kuhl and Hasselt's unpublished drawings. It is, however, not the *Herba supplex quinta* of Rumphius, as I formerly suspected, the figure of that plant certainly representing *D.* (*A.*) *subteres.* According to Griffith this is also the *Dend. acinaciforme,* Roxb.

74. **D. (A.) LOBBII**: caulibus apice aphyllis, foliis scalpelliformibus duplo longioribus quam latis; floribus minutissimis terminalibus; sepalis recurvis; labello erecto carnoso trilobo; lobis lateralibus brevioribus unguiculato.
Borneo, forests of Labuan, *T. Lobb.*

This looks like a very small state of *D. Serra*; but the leaves are

* Prof. H. G. Reichenbach reduces *Oxystophyllum* to *Dendrobium.* Neither the materials with which he has favoured me nor those in my own herbarium enable me to form a decided opinion on the subject. In fact that whole genus, if it be one, is in inextricable confusion. A fragment of Blume's *Sarcostoma,* and a drawing of the details of its structure, for which I am also indebted to my learned friend, seem to show that that genus should be preserved. The pollen-masses are represented as having long tails, and have no resemblance to Blume's figure.

more distant and rather narrower, the sepals are recurved, and the lip quite different in form. The flowers are not larger than those of the smallest *Oberonia.* The whole plant forms a tuft little more than 2 inches high.

75. D. (A.) anceps, *Wallich, Catalogue,* No. 2020.

My flowers of this are unexaminable. It cannot be the *D. anceps* of Roxburgh, which has lateral flowers only.

76. D. (A.) LUNATUM: foliis scalpelliformibus densis obtusiusculis, labello lunato ante unguem canaliculatum crista transversa instructo.
Philippines, *Cuming.*

Flowers scarcely larger than in *D. (A.) Lobbii.* The lip is quite unlike that of any other of the section.

76*b*. D. parciflorum, *Rchb. f. MSS.* (D. Jenkinsi, *W. Griffith, in Calc. Journ. N. H.* v. 367. t. 25); an Assam plant with large white terminal flowers, I have not seen.

77. D. (A.) subteres, *Griffith in Calc. Journ. N. H.* v. 370. (Herba supplex quinta species, *Rumph. Amb.* vi. t. 51. f. 2?)
Malacca, *Griffith.*

This is a very distinct plant, with the long slender leafless terminations of its shoots yellow, polished, and remarkably flexuose.

78. D. (A.) Roxburghii, *Griffith, l. c.* (Dend. Calceolum, *Roxb. Flor. Ind.* iii. 370. Herba supplex femina, *Rumph. Amb.* vi. t. 51. f. 1.)
New Guinea, *Hindes*; Amboyna, *Roxburgh.*

Judging from the account of this plant given by Griffith, it must be a very distinct plant, with "large dull-orange flowers slightly veined with dull red." The lip, he adds, is represented as almost 4-lobed, or 3-lobed with the central lobe emarginate. In my specimen, without flowers, the long leafless branches are straight, not flexuose, and the distant leaves when full-grown are thin, $1\frac{3}{4}$ inch long by $\frac{2}{10}$ of an inch wide. The figure in Rumphius makes them broader.

** *Flores laterales tantum.*

79. D. (A.) anceps, *Roxb. Flor. Ind.* 487; *Griffith in Calc. Journ. N. H.* v. 369; *Bot. Mag.* t. 3608; *Bot. Reg.* t. 1239; *Bot. Cab.* t. 1895, not of Wallich's Catalogue.
Sikkim, hot valleys, *J. D. H.* (14).

80. D. (A.) cuspidatum, *Wallich in Bot. Reg.* 1841, *Misc.* 7.
Khasija, at 2000 feet, *J. D. H. & T. T.* (14 in part); Moulmein, *T. Lobb.*

Perhaps this is not distinct from *D. anceps*, with which it is mixed in the Khasija specimens; but its long naked terminal shoots, narrower leaves, much smaller flowers, and almost flabelliform lip, seem to be sufficiently different.

81. D. (A.) EULOPHOTUM: foliis crassis scalpelliformibus obtusiusculis approximatis; labello rotundato crista maxima transversa utrinque acuta.

Mergui, *Griffith*; Java, *T. Lobb* in hb. Hooker.

Of this I have a carefully prepared drawing by Griffith. Its great transverse crest on the lip resembles nothing except what is found in *D. indivisum* of Blume; but that plant, the *Schismoceras distichum* of Presl, has terminal capitate flowers. The Java plant is rather different, the apex of the lip being deeply and widely retuse, while Griffith's plant is, according to his drawing, regularly rounded; but I see no other difference.

§ II. STRONGYLE, *Lindl. in Paxt. Fl. Gard.* i. sub t. 27.

Under this are included all the species with terete leaves. Some occur among the collections from continental India. I have one or two to add to those already on record.

82. D. UNCATUM: foliis rigidis triquetris brevibus distichis retrorsum uncatis acutis; labello obovato bilobo intra sinum obsolete tristiche papilloso.

Java, *T. Lobb* (156).

This differs from *D. subulatum* in its strongly hooked leaves, broader, more emarginate lip, and larger flowers. Nevertheless Prof. Reichenbach, who saw both in my herbarium, does not distinguish it. (See *Bonplandia*, March 1, 1857.) It is not unlike a small form of *D. subteres*.

§ III. RHIZOBIUM, *Lindl.*, *l. c.*

Of this there is no Indian species.

§ IV. DENDROCORYNE, *Lindl. in Bot. Reg.* 1844, t. 53; 1847, t. 36. *Paxton*, *l. c.*

This section must be confined to the species with stems or pseudo-bulbs bearing leaves at the apex only, and always of a thick leathery structure. What I have formerly called *Desmotrichum*, only in part the same as Blume's genus of that name, have for their character the same vegetation, with a lip whose middle lobe is broken up into long threads.

* *Flores terminales. Labellum margine continuum.*

83. D. Macræi, *Lindl. Gen. & Sp. Orch.* No. 3. (?D. nodosum, *Dalzell in Hook. Journ.* iv. 292.)

Ceylon, *Macrae*; Nilgherries, Madras Herbarium, *J. D. H.* (27)?; Khasia, at the height of 4000 feet, *J. D. H.* (26)?

The flowers of *D. Macræi* were described as having an entire lip, upon the faith of a Cingalese native drawing. It is, however, very doubtful whether such is their structure, and I can hardly doubt that Dalzell's *D. nodosum*, of which I have examined perfect flowers out of the herbarium of my late lamented friend Dr. Stocks (No. 30), is the same plant. Its leaves, indeed, are narrower, and its pseudo-bulbs less unequal-sided, in the specimens before me. Of Dr. Hooker's No. 26, from Khasia, the flowers are unknown, but are said to be solitary and white; the leaves are not half the width of *D. Macræi*, and the pseudo-bulbs are so slender as to be scarcely distinguishable from the main stem. All are nearly allied to *D. flabellum* of Reichenbach.

84. D. PUMILUM (*Griff. Notul.* iii. p. 315); **pseudobulbis clavatis tetragonis nitidis diphyllis, foliis brevibus ovato-oblongis obtusis, floribus inter squamas subsessilibus, sepalis petalisque acuminatis, mento attenuato incurvo ovario subæquali semifisso, labello unguiculato oblongo nudo dimidia superiore acuminata crispa.**

Mergui, on trees, *Griffith* (24 and 1175).

Flowers small, white, sweet-scented, according to Griffith, whose description is, however, not quite exact. In habit it resembles *D. tetragonum.*

85. D. LABUANUM; pseudobulbis parvis diphyllis secus caulem arcte adpressis, foliis obtusis anguste ovalibus obtusiusculis, floribus solitariis, labello trilobo intra apicem papilloso axi elevata carnosa abrupta.

Borneo, *T. Lobb.*

This is related to *D. cymbidioides* and its allies, but the flowers are much smaller.

86. D. BRACHYPETALUM; **pseudobulbis parvis monophyllis secus caulem arcte adpressis, foliis obtusis, floribus geminis subsessilibus, sepalis acuminatis, petalis acutissimis duplo brevioribus, mento brevi, labello brevi oblongo acuto bicarinato.**

Java, *T. Lobb* in hb. Hooker.

A small species with flowers not larger than in an Oberonia. The short acute petals and lip are unusual.

87. D. RABANI; pseudobulbis subcylindraceis monophyllis secus caulem imbricatis, folio oblongo obtuso, floribus parvis sessilibus terminalibus, sepalis petalisque acutis æqualibus, mento brevi, columna bicamerata, labello basi excavato lævi lamina intus villosa medio tuberculata.
Khasia, in Mr. Raban's garden, at 4000 feet, *J. D. H.* (25).

"Flowers small, white, sweet-scented." I have been unable to ascertain the form of the lip; but the other characters are amply sufficient to distinguish this.

** *Flores laterales. Labellum margine continuum.*

Some of the supposed species of this section are probably founded on insufficient grounds. *D. Farmeri* (Bot. Mag. t. 4659), for instance, is scarcely distinct from *D. chrysotoxum* (Bot. Reg. 1847, t. 36), although its flowers are tinged with pink, and its lip less abundantly fringed. In like manner my *D. palpebræ* (Journ. Hort. Soc. v. 33) may be a white-flowered variety of *D. Griffithianum* (Bot. Reg. xxi. 1756). The only species among the collections of Hooker and Thomson is—

88. D. densiflorum, *Wallich, Plant. As. rar.* t. 40; *Bot. Mag.* t. 3418.
Sikkim, at 1000–5000 feet of elevation, *J. D. H.* (7 and 150); Khasia at 2000–4000 feet, *J. D. H. & T. T.* (7).

89. D. EUPHLEBIUM (*H. G. Rchb. MSS.*); caule angulato clavato basi angustato, foliis geminis membranaceis ovali-lanceolatis, flore solitario laterali, labello oblongo unguiculato concavo emarginato cordato, venis ab axi carnoso rectangulis divergentibus.
Java, *T. Lobb.*

A very distinct plant, remarkable for its clavate angular stem tapering to the base, and solitary lateral flower.

*** *Labelli lobus medius stuposus* (Desmotrichum).

The species hitherto known are wholly insular.

§ V. HOLOCHRYSA.

* *Fasciculata;* floribus solitariis, fasciculatis aut breviter racemosis.

In proposing now, for the first time, to collect into one group all the distichous-leaved yellow species, I have no character to rest upon except the uniformly yellow colour of all parts of the flower, a colour disappearing somewhat in *D. aureum*, whose yellow almost fades into white in the variety called *D. rhombeum*, just as that of *D. Griffithianum* disappears in its variety *Palpebræ*.

* *Flores fasciculati, aut geminati, aut in racemulis 3–4-floris.*

90. D. Hookerianum; foliis ovatis acuminatis, pedunculis 3–4-floris, bracteis minutis, sepalis petalisque subæqualibus integris, labello ovato fimbriis crinitis cincto laminæ ipsæ æqualibus, ungue convoluto basi retrorsum bidentato.

Sikkim, at 1000-5000 feet, *J. D. H.* (8).

A very striking species, with flowers as large as *Dalhousieanum*, with very long shaggy fringes surrounding the labellum, which has two blood-red spots on each side above the unguis itself, furnished at the base with a double reversed tooth. There is a figure among Mr. Cathcart's drawings.

91. D. chrysanthum, *Wallich, Cat.* No. 2012; *Bot. Reg.* 1299.

Darjeeling, *Griffith*; Khasija, *Griffith*; at 3000-5000 feet, *J. D. H. & T.T.* (13); Churra, *J. D. H.*; Sikkim, in hot valleys, at 2000-5000 feet, *J. D. H.* (13).

There is scarcely any variation among the numerous specimens before us. All have the broad rounded sepals and strictly fascioled flowers so characteristic of this beautiful species. *Dendrobium Paxtoni* (Bot. Reg. 1839, Misc. 56), of which I have seen no wild specimen, differs in its longer and less rounded petals, which are slightly serrated.

92. D. ochreatum, *Lindl. in Wall. Cat.* no. 7410. (D. Cambridgeanum, *Paxton, Mag. Bot.* vi. 265; *Bot. Mag.* t. 4450.)

Khasija, *Griffith.*

Prof. H. G. Reichenbach informs me that the odd stigma is at the base of the fovea stigmatica, and not at the apex beneath the rostellum as usual,—a circumstance I have not had an opportunity of observing.

Other species of this section are *aureum*, Lindl., or *heterocarpon*, Wallich, of which *D. rhombeum*, Lindl. is a white variety; *villosulum*, Wall., or *Jerdonianum*, Wight; *Ruckeri*, Lindl.; *sanguinolentum*, Id.; *rugosum* and *salaccense*, Blume; and I suppose *intermedium* and *ochróleucum*, Tijsmann.

** *Racemosa*; racemis multifloris.

93. D. moschatum, *Wall. Pl. As.* ii. p. 83.; *B. M.* t. 3837.

Khasija, at 4000 feet, *J. D. H. & T. T.* (16).

94. D. fuscatum; foliis oblongo-lanceolatis acutissimis, racemis filiformibus flexuosis, bracteis linearibus herbaceis, petalis sepalisque subæqualibus oblongis rotundatis, labello oblato cucullato retuso denticulato ciliato.

Sikkim, *Cathcart*, in hot valleys, *J. D. H.* (12); Khasija, at 2000-4000 feet, *J. D. H. & T. T.* (12).

This remarkable plant has orange-brown sepals, and in the shape of its parts is like *D. chrysanthum*, but with ten or twelve flowers in a slender raceme. The petals are orange-yellow, as also is the lip, which has two crimson spots on each side. The flowers of the Khasija specimens are smaller than in those from Sikkim.

§ VI. Aclinia, *Griffith, Not.* iii. 320.

In retaining this supposed genus as a section of *Dendrobium*, I must at the same time observe that the species are probably Pelorias of others, although, with perhaps one exception, their parentage cannot be traced. They are all characterized by a perfect, or nearly perfect, regularity in the inner as well as outer series of floral envelopes, one result of which is the loss of the mentum, which belongs to all the other plants collected under the genus. In the case of *D. normale*, the column seems to be always triandrous; and in *D. Pseudaclinia*, there is sometimes an apparent attempt to gain that structure. It is, however, for Indian botanists to investigate this curious subject, and trace the monsters, if monsters they are, to their origin. Prof. H. G. Reichenbach has discovered that Endlicher's genus Thelychiton, founded on a terrestrial Norfolk Island plant, is one of these Aclinias. Judging from a tracing from Ferdinand Bauer's drawing in the Vienna Museum, it seems possible, perhaps probable, that this plant (*Dendrobium macropus*, H. G. Rchb.) is a Peloria of *D. elongatum*, A. Cunn. (*D. brisbanense*, H. G. Rchb.). I also much suspect my genus *Paxtonia* to be nothing more than a Peloria of *Spathoglottis spicata*.

95. D. Aclinia. (Aclinia, *Griff. Not.* iii. 320. t. 351 A. fig. 21.)
Mergui, *Griffith* (809).

I can have no doubt that this is a Peloria of *D. incurvum* (*infra*, No. 133), which seems to have been gathered by Griffith in the same place on the same day. The flowers are in pedunculate divaricating secund racemes, and appear to have been white, as Griffith describes them.

96. D. Pseudaclinia. (Dend. Aclinia, *Rchb. f. in Bonpl. Oct.* 15, 1856.)
Bootan, *Hort. Kew.*

This has flowered with Consul Schiller at Hamburg as well as at Kew; and Prof. Rchb. informs me that it has also been received by the same great cultivator from Manilla. It is a slender erect plant with yellow flowers, springing in pairs or singly from the sides of the stem. I have before me a sketch by Rchb. made at

Hamburg, and another of my own dated Sept. 1854, in both which the stigmatic hollow is concealed by a tooth-like elevation of its lower edge, a structure also occurring in *Thelychiton* and *D. normale*; in the Kew plant there was, moreover, a bristle on one side of this front tooth, and external to it; but Prof. Reichenbach did not find it in many fresh flowers examined by himself, nor does either the bristle or the front tooth occur in the original *Aclinia*. The meaning of these malformations opens a curious field of inquiry, to which I hope to address myself on a future occasion.

97. D. LAWANUM; caule juniore carnoso ascendente foliis membranaceis lanceolatis acutis, florido aphyllo vaginis laxis membranaceis fere abdito, sepalis petalisque ovatis obtusiusculis, labello paulo majore conformi concavo. (Dendrochilum roseum, *Dalzell in Hooker's Journal*, iv. 291.)

On trees on the Syhadree range of mountains, *Dalzell in hb. Stocks* (31); Concan, *Law in hb. Hooker* (2).

Mr. Dalzell states that in this plant, "across the front of the column and below the orifice of the stigmatic cavity, there is a small crest terminated on each side by a deeply-coloured horn, two- or three-toothed at the apex." This seems as if we had here also some monstrous structure; but I am unable to refer the plant to any of the Eudendrobia, unless indeed *D. transparens* should claim it; and I must add, that there was nothing unusual in the column of the only flower I have had an opportunity of dissecting.

98. D. TETRODON (*H. G. Rchb. in litt.*); caulibus floridis tenuibus pendulis aphyllis junioribus foliis anguste lanceolatis membranaceis subobliquis, floribus geminatis, sepalis petalisque lineari-lanceolatis acutissimis, mento obsoleto, labello conformi paulo majore et obtusiore, clinandrio quadridentato.

Java, on trees at the foot of M. Salak, *Zollinger* (11).

Of this I have a good specimen from Prof. Reichenbach. It has the habit of such a plant as *D. transparens*; and there is a slight tendency to the extension of the lateral sepals at the base. Can it be a Peloria of *D. macrostachyum*? I find nothing monstrous in the column.

99. D. normale, *Falconer in Ann. Nat. Hist.* iii. 196; *Griffith, Not.* iii. 255. t. 284.

Western Himalayas; Mussooree and Landour, *Col. Vicary*; pass near Paoree in Gurwhal, at 4000–6000 feet, *T. Thomson* (17); Saharunpur, *Falconer*.

My examination of this singular plant agrees with Dr. Falconer's description. Although a monster, I am unable to indicate the species to which it may possibly belong. Suspicion points to *D. fimbriatum*; but that species seems to be quite an eastern plant, while *D. normale* has hitherto been seen only in the Western Himalayas. The late Col. Vicary informed me that the specimens which he first found, and from which Dr. Falconer's description was taken, were gathered in 1832, in the vicinity of Mussooree and Landour.

§ VII. EUDENDROBIUM, *Lindley, in Paxton's Fl. Gard.* i. sub t. 27.

I have no other change to make in the limits of this large section than the exclusion of all the species with great yellow flowers, which now stand in the first section of *Holochrysa*.

A. *Caule* 0, *v. brevissimo carnoso* (Bolbodium, *Lindl. l. c.*).

No species are among the Hookerian collections. The following are new.

100. D. SUBACAULE, *Reinwardt, MSS.*; folio parvo oblongo pedicellis geminatis breviore, sepalis petalisque acuminatis, labello nudo latiori subconformi, mento gracili recto petalis duplo longiore, ovario triptero.
Java, on the top of Mount Tidore, *Reinwardt*.

Whole plant, the vermilion flowers included, is little more than an inch high. This is the smallest of the genus.

101. D. PRASINUM; folio ovali obtuso, floribus solitariis, sepalis lanceolatis petalisque ovatis acutissimis, mento brevi obtuso, labello unguiculato auriculato rhombeo acuminato concavo nudo bilineato.
Feejee islands, 2000 feet above the sea, *Asa Gray*.

A very distinct plant, of which I only know a drawing by Agati, in the possession of my learned friend Prof. Asa Gray. The flowers are sea-green, nearly two inches in diameter. The sepals about ⅜ of an inch wide.

102. D. extinctorium, *Lindl. in Bot. Reg.* sub t. 1756.
Moulmein, *Griffith*, on Careya arborea, in damp places.

A true *Dendrobium*, as is shown by its pollen-masses. Pseudobulbs depressed. Peduncles filiform, erect, 2 to 3 inches long, one-flowered, with a minute bract about an inch off the ovary.

B. *Caule elongato.*

* Labello integro.

This group consists of numerous species so nearly related to

each other that it is scarcely possible to find good distinctions for them. Even when seen alive in their natural state, the uncertainty is the same. "All the species," says Griffith, "with cochleate labella are nearly akin; they run into each other so much, that distinguishing marks are very difficult." (Itinerary Notes, p. 185, speaking of a form of *Dendrobium nobile* found at Panukka in Bootan.)

103. D. pulchellum, *Lindl. Gen. & Sp.* No. 35; *Bot. Cab.* t. 1935. (D. brevifolium, *Hort.* D. Devonianum, *Paxton, B. M.* t. 4429. D. pictum, *Griffith.*)
Khasija, *J. D. H.* (15); Bootan, *Griffith.*

I have this from Bootan from Griffith, under the name of *D. pictum*, but have failed to discover any trace of it in his Itinerary Notes.

104. D. Pierardi, *Roxb. Fl. Ind.* 3. 482.
Valleys of Sikkim, *Cathcart*; *J. D. H.* (5).

105. D. primulinum, *Lindl. in Gard. Chron.* 1858, no. 223. (D. nobile pallidiflorum, *Bot. Mag.* t. 5003.)
Hot valleys of Sikkim, *J. D. H.* (154).

Possibly this is not distinct from *D. cucullatum*, as is suggested in the work above referred to.

106. D. transparens, *Wallich, Cat.* No. 2008. (D. Henshalli, *Rchb. f.*; *Bot. Mag.* t. 4663.)
Sikkim, at 2000 feet, *J. D. H.* (153); on rocks towards Chuka, in Bootan, and near Murichom, at 3500 to 4000 feet, *Griffith.*

I am unable to distinguish the Sikkim specimens from this plant, although they are somewhat larger than such as have appeared in our gardens; there can be no doubt that it is the No. 1135 of 'Griffith's Itin. Notes,' p. 198, and Prof. Rchb. has himself pointed out the identity of his *D. Henshalli.*

107. D. amœnum, *Wallich, in Lindl. Gen. & Sp. Orch.* p. 78.
Sikkim, *Cathcart* (Ic.).

This is readily known by its narrow, blunt, nearly equal sepals and petals, each with a purple stain at the point.

108. D. nobile, *Lindl. Gen. & Sp. Orch.* 24. (D. cærulescens, *Lindl. Sert. Orch.* t. 17.)
Khasija, *Griffith, J. D. H.*; Darjeeling, *Griffith*; Assam, *Id.*

Evidently variable in the size, and probably in the colours, of the flowers. It is the No. 940 of Griffith's Itin. Notes, p. 184.

109. D. Lindleyanum, *Griffith, Not.* iii. 309.
Hot valleys in Sikkim, at 1000–5000 feet of elevation, *J. D. H.* (6).

This, notwithstanding the size of the flowers, which are twice as large as in *D. nobile*, is probably a mere variety of that species.

110. D. FURCATUM (*Reinwardt*); caule gracillimo, foliis linearibus apicem versus angustatis obtusis, sepalis ovatis obtusis, petalis unguiculatis cuneatis retusis latioribus, labello lanceolato acuto nudo intra mentum rectum sepalis longiorem clausum fere abdito.
Celebes, *Reinwardt*.

A remarkable plant, which, because of the sepals almost completely united into a long chin, might be perhaps better referred to *Pedilonum*. I have only seen fragments of a stem and leaves, and a perfect flower. The broad cuneate petals are very characteristic.

111. D. DISTACHYON; foliis distichis linearibus oblique bidentatis basi latioribus, floribus solitariis, axillaribus subsessilibus, sepalis petalisque angustioribus acutis, labelli ungue lineari-elongato lamina oblata nuda.
Borneo, *Thomas Lobb*.

This and the two following resemble *D. excisum, revolutum,* and *metachilinum* in habit.

112. D. LYCOPODIOIDES; foliis distichis densis linearibus apice obliquis apiculatis, floribus solitariis, bracteis lineari-lanceolatis carinatis pungentibus, sepalis acutissimis lateralibus latis triangularibus, petalis angustioribus minus acutis mento subrotundo, labello sessili obovato concavo apiculato lamellis 2 maximis carnosis.
Borneo; forests of Sarawak, *T. Lobb*.

Very like one of the larger *Lycopodia*. Flowers scarcely more than 2 lines long. Both this and the following are distinguished by two fleshy parallel plates almost as broad as the lip itself on which they lie.

113. D. TMESIPTERIS; foliis distichis distantibus linearibus apice obliquis, floribus solitariis, bracteis lineari-lanceolatis carinatis pungentibus, sepalis acutissimis dorsali apice recurvo lateralibus antice arcuatis, petalis angustioribus acutissimis subfalcatis, mento oblongo prominente, labello sessili obovato concavo mucronato margine apicis membranaceo crispulo lamellis 2 maximis carnosis.
Borneo; forests of Sarawak, *T. Lobb*.

Very like a *Tmesipteris*. Differs from the last in the flowers being even smaller, as well as in the points above described.

114. D. SPINESCENS; caulibus erectis, foliis distantibus oblongo-lanceolatis, pedunculis oppositifoliis squamosis demum spinescentibus, sepalis labelloque oblongis obtusis, petalis conformibus triplo minoribus. (*Cymbidium spinescens*, Ic. Reinwardt.)
Java? *Reinwardt.*

Very different, in its flowers having the sepals spreading and ¾ of an inch long, from any of the allied species. According to Reinwardt's drawing, the fruit is nearly cylindrical, angular, and surmounted by the sepals, petals, lip, and column, much enlarged and become quite green. There is no specimen in the herbarium of Reinwardt.

** Labello trilobo; *calvæ.*

115. D. BREVIFLORUM; fasciculo florum sessili subgloboso, sepalis petalisque duplo brevioribus carnosis obtusissimis, labello oblato nudo lobis lateralibus falcatis auriformibus intermedio truncato plica utrinque sub sinubus.
Singapore? *Herb. Loddiges.*

I know nothing like this, which flowered in 1844, in the nursery of Messrs. Loddiges. The flowers are white, fleshy, with stripes of crimson spots.

116. D. stuposum, *Lindl. in Bot. Reg.* 1838, *misc.* 94.
Khasija mountains, at 2000–4000 feet of elevation, *J. D. H. & T. T.* (11).

The lip is 3-lobed, not entire as is stated in the original definition taken from an imperfect garden specimen, which led Prof. Reichenbach to suppose that his *D. sphegidoglossum* was different,—a mistake the blame for which is mine.

117. D. Blumei, *Lindl. Gen. & Sp. Orch.* No. 65. (Onychium fimbriatum, *Blume, Bijdr.* p. 325. Dend. planibulbe, *Lindl. in Bot. Reg.* 1843, *misc.* 70.)
Java, *Zollinger*; Manilla, *Loddiges.*

An authentic fragment from Prof. Reichenbach shows that the Manilla plant is identical with that from Java.

118. D. aqueum, *Lindl. in Bot. Reg.* 1843, *misc.* 6. t. 54; *Bot. Mag.* t. 4640. (D. album, *Wight, Ic.* t. 1645.)
Khasija hills, *T. Lobb.*

This is not to be found in the collections of Hooker and Thomson; nor have I seen any wild specimens, except a few flowers sent home by Mr. Thomas Lobb to Messrs. Veitch. These want the long hairs represented by Dr. Wight's artist, but agree perfectly with the figure in the Botanical Magazine. *D. ramosum,* an obscure plant with a slender pendulous branched stem and lan-

ceolate acuminate leaves, is apparently near this; but the fragments of flowers before me afford little information except that the lip is broad with fine hairs on the inside near the edge.

119. D. SPATHACEUM; caulibus gracilibus erectis, foliis anguste oblongis apice oblique obtusis, bracteis linearibus membranaceis basi coloratis, sepalis petalisque æqualibus acutis mento brevi rotundato, labelli angusti lanceolati laciniis lateralibus rotundatis medio tuberculatis ad sinus plicatis intermedia duplo longiore acuta.

Sikkim, at the height of 6000 feet, *J. D. H.* (143).

A solitary specimen of this exists in Hooker's herbarium; the stems are about 6 inches long, and the flowers (apparently solitary) the size of those of *D. macrostachyum*.

120. D. SCABRILINGUE; foliis oblongis apice obtusis valde obliquis, floribus geminatis, sepalis petalisque ovalibus æqualibus, mento conico, labelli 3-lobi medio pluries canaliculati lobis lateralibus semiovatis obtusis intermedio carnoso oblongo scabro multo brevioribus.

Borneo, *T. Lobb.*

A pair of flowers and a single leaf, communicated by Messrs. Veitch, are the materials on which this very distinct species is established. Its structure is, however, so peculiar, that no doubt can exist of its perfect distinctness from any other yet known. The flowers appear to be white. The lateral sepals from the point of the mentum to their own apex are about an inch long.

121. D. TRUNCATUM; caulibus gracilibus ramosis basi ramulorum subrotundis incrassatis, foliis linearibus oblique emarginatis, floribus solitariis, sepalis petalisque ovatis acutissimis æqualibus, mento ascendente valde obtuso ovario duplo longiore, labelli laciniis lateralibus semicuneatis intermedia lineari basi unidentata.

Java, *Reinwardt, Lobb.*

I find this among Reinwardt's plants under the name of *Ophrys pubescens* of Blume; probably owing to some error in labelling, for there is no such name known to me, nor has this any structure that can be called pubescent. It is a very small-flowered slender species, closely allied to *D. tetraedre*, from which it differs in the labellum, and in the thickened bases of the branches being round or roundish oblong, not at all angular.

122. D. INVOLUTUM; caulibus teretibus, foliis ovato-lanceolatis oblique obtusis, gemmis oppositifoliis conicis, sepalis petalisque lineari-lanceolatis æqualibus acuminatis apice incurvis, mento brevi acuto, labelli laciniis lateralibus acutis falcatis intermedia revoluta crispa acuminata brevioribus.

Society Islands, pendulous from the branches of trees, *Mathews.*

Flowers a quarter of an inch long, with the points of all the divisions hooked or rolled downwards.

*** Labello trilobo; *nigro-hirsutæ.*

These species are all distinguished by the presence of short black hairs on the young stems, a peculiarity which separates them from everything except *D. furcatum.*

123. D. formosum, *Roxb. Flor. Ind.* iii.; *Wallich, Pl. As.* t. 39; *Bot. Reg.* 1839, t. 64.
Khasija, *J. D. H. & T. T.* (1007); *T. Lobb* (373). Moulmein, *Griffith* (350).

124. D. INFUNDIBULUM; foliis lanceolatis angustis acutis, sepalis lineari-oblongis, petalis oblongis obtusis triplo latioribus, mento infundibulari pedicello æquali, labelli lobis lateralibus rotundatis integris intermedio subrotundo plano serrulato emarginato.
Moulmein, at 5000 feet on Thoung-gyun, *T. Lobb, in hb. Hooker.*

A very striking plant, intermediate between *D. formosum* and *longicornu,* having the large flowers of the former and the slender habit and narrow leaves of the latter. The lip with large round lateral lobes also distinguishes it from the former, and the large petals with a circular middle lobe to the lip and short funnel-shaped mentum from the latter.

125. D. longicornu, *Lindl. in Wall. Cat.* 1997; *Bot. Reg.* t. 1315. (D. flexuosum, *Griffith, Notul.* iii. 317. D. hirsutum, *Id.* iii. 318. t. 305.)
Khasija, *T. Lobb, Griffith*; at 4000-6000 feet, *J. D. H. & T. T.* (10); Sikkim, inner valleys at 5000 feet. *J. D. H.* (10); Assam, *Griffith.*

A variable plant as to the form of the middle lobe of the lip, which is broken up into fringes in very unequal degrees, and as to the size of the flowers, which however appear to have always a membranous lip, with strong orange-coloured veins on the lateral lobes.

126. D. XANTHOPHLEBIUM (*Lindl. in Gard. Chron.* 1856, no. 196); caule foliisque *D. longicornu*; sepalis petalisque linearibus acutis, mento brevi, labelli carnosi lobis lateralibus triangulis obtusis intermedio ovato dilatato apiculato crispo scabro: axi elevata carnosa.
Moulmein, *T. Lobb* (176, 177).

Flowers much smaller than in the last, with quite a different, fleshy not membranous, lip. Flowers white. Lip yellow with orange-coloured veins and disk. It is cultivated by Messrs. Veitch.

127. D. ATTENUATUM; foliis linearibus gramineis patentissimis, floribus solitariis squamulis minutis obtusis, sepalis petalisque obtusiusculis, mento lineari obtuso, labelli elongati spathulati lobis lateralibus dentiformibus intermedio subrotundo margine carnoso medio subaspero tuberculis geminis linearibus.

Borneo, *T. Lobb.*

Flowers small, apparently white. Leaves long, narrow, and grassy. Stems slender, ascending, from 6 to 8 inches high.

*** The only other species of this section are *D. calcaratum* (Bot. Reg. 1840, misc. 218) and *D. nutans* (Gen. & Sp. Orch. No. 73), whose lip is not undivided as it was supposed to be, but lanceolate with short entire lateral lobes and a crisp, almost linear, middle part, as I learn from specimens communicated by my learned correspondent Mr. Thwaites (156).

§ VIII. Pedilonum, *Blume.*

No continental species of this section have been observed, nor have I found among the collections examined by me anything like Roxburgh's *D. purpureum*, a Molucca plant. The following are new insular species.

128. D. AUROROSEUM (*Rchb. f. in litt.*); foliis angustis ovato-lanceolatis acutis, sepalis petalisque æquilongis acutis, mento elongato obtusissimo, labello nudo oblongo apice dilatato retuso utrinque reflexo ungue unituberculato.

Java, *T. Lobb*; *Zollinger* (231).

The oval lip, suddenly expanded into a broad apex reflexed on each side, and the extremely broad mentum, are like nothing elsewhere in this section. The flowers are the size of *D. Pierardi.*

129. D. BURSIGERUM; foliis oblongis acutis, spicis cylindraceis densifloris, sepalis petalisque acutis, mento arcuato infra apicem ventricoso, labello spathulato acuto cucullato.

Philippines, *Cuming.*

Like *D. secundum*, but flowers are not half the size, and in longer, slenderer, not secund spikes. Lip apparently white with an orange-yellow tip.

130. D. REINWARDTI; foliis anguste oblongis obtusis apiculatis, spicis densissimis brevibus, bracteis setaceis divaricatis, sepalis acutis, petalis obtusiusculis, mento duplo longiore apiculato, labello nudo angusto spathulato obtusiusculo.

Banda, *Reinwardt.*

Near *D. viridiroseum* of Rchb. f., from which it differs in its

longer apiculate mentum, and in the blunt lip not at all contracted in the middle.

§ IX. Stachyobium, *Lindl. in Paxton, Fl. Gard.* i. sub t. 27.

* *Labello integerrimo.*

131. D. Dalhousieanum, *Paxton, Mag. Bot.* xi. t. 145; *Bot. Reg.* 184, t. 10.

Mergui, *Griffith* (Dendr. No. 7, *Notul.* iii. 313).

An authentic specimen from Griffith shows that this fine species was described by him in the place above quoted; and thus its native country is now ascertained.

132. D. ramosissimum, *R. Wight, Ic.* 1648.

S. Concan, *Dalzell in hb. Hooker.* (*Stocks*, 52).

This is very near my *D. herbaceum* (Bot. Reg. 1840, misc. 153); but the flowers are white with a yellow lip, not white tinged with green; the lip itself is longer and more fleshy, and the flowers are considerably smaller. I have examined fresh specimens out of Mr. Bellenden Ker's garden from Dharwar.

133. D. incurvum; foliis angustis membranaceis oblique obtusis apiculatis, racemis oppositifoliis rectiusculis brevioribus, bracteis membranaceis uninerviis pedicellis æqualibus, sepalis angustis acutissimis antice cum mento semiaperto acuto arcuatis, petalis angustioribus, labello oblongo venoso antice serrato circa discum 2-denticulato.

Mergui, *Griffith* (808).

This is the *Dendrobium* No. 9 of Griffith's Notul. iii. 314, forming the number succeeding to that of his *Aclinia*, and apparently gathered in the same place. It has so entirely the appearance of that plant, that, as has been already observed, it is difficult to doubt that it is not the customary state of the species, notwithstanding the very different structure of the flower.

134. D. porphyrochilum; caulibus brevibus cæspitosis tetraphyllis, foliis angustis membranaceis racemis terminalibus multifloris sæpius æqualibus, bracteis setaceis ovario subæqualibus persistentibus, sepalis lineari-lanceolatis acuminatis, petalis paulo brevioribus, labello breviore ovato acuto concavo lineis 3 elevatis, mento brevissimo rotundato.

Assam, *Griffith*; Khasija hills, *T. Lobb*; at 4000–6000 feet, *J. D. H. & T. T.* (28).

"Sepals dirty pale yellow. Petals the same, with small red streaks at the base. Lip purple with a yellow margin."—*J. D. H.* The whole plant seems thin and membranous, and varies in height from 2 to 5 inches. It approaches the *Bolbodia*.

** *Labello trilobo.*

135. D. PANDURATUM; subacaule, foliis membranaceis acutissimis racemis filiformibus erectis brevioribus, bracteis minutis squamiformibus, sepalis petalisque linearibus acuminatis, mento recto conico semiaperto, labello æquilongi pandurato (trilobo lobis lateralibus rotundatis intermedio duplo majore crenulato apiculato).

Ceylon, *hb. Hooker.* (147); *Thwaites* (2353).

A small species almost referable to *Bolbodium.*

136. D. eriæflorum, *Griffith, Not.* iii. 316. t. 307.

Khasija, in Myrung Wood, on dry ridges, *Griffith* (1020), on rocks and dry trunks of trees at 2000–5000 feet, *J. D. H. & T. T.* (18).

This forms tufts from 4 to 9 inches high. The stems are covered with great loose sheaths of fallen leaves. The flowers are in dense nodding racemes; according to Cathcart's drawing, greenish yellow with purple mentum. The lip is strongly veined and edged with purple; its side lobes regularly and sharply serrated, its middle lobe small, oblate, apiculate, and entire. It would be a beautiful species in a garden.

137. D. PYCNOSTACHYUM; caulibus laxe membranaceo-vaginatis erectis carnosis, foliis ......, racemis densis cylindraceis, bracteis setaceis rectangulis persistentibus ovario æqualibus, sepalis linearibus acuminatis, petalis minoribus, mento brevi obtuso incurvo, labelli lobis lateralibus acutis integerrimis intermedio triangulari recurvo crispo parum latioribus axi juxta sinus abrupto elevato.

Moulmein, *T. Lobb.*

Like *D. eriæflorum*, but with smaller and denser flowers and a totally different lip.

138. D. microbolbon, *Ach. Richard, Ann. Sc. n. s.* xv. t. 8. (D. humile, *R. Wight, Ic.* 1643. D. crispum, *Dalzell, in Hooker's Journal*, iv. p. 111.)

Trees in Western India, *Dalzell* (*Hb. Stocks.* 34).

There is no doubt that all three of the above plants are the same. A. Richard's figure is very formal and uncharacteristic.

139. D. denudans, *Don, Prodr.* 34.

Sikkim, in the drier valleys, at 5000 feet, *J. D. H.* (20); E. Nepal, at 4000 feet, *Id.*

This varies in height from 4 to 15 inches. In the Sikkim plant the colours are bright red on a pale yellow ground, according to a drawing by Dr. Hooker; in gardens they are much greener.

140. D. PEGUANUM; caulibus ovatis cæspitosis, foliis (linearibus?), racemis erectis densis multifloris, bracteis membranaceis acutissimis

ovario longioribus, petalis linearibus falcatis sepalis multo longioribus, mento elongato, labello longe unguiculato subrotundo cochleato axi abrupta obtusa, lobis lateralibus semicircularibus intermedio parvo triangulari crispo.

Pegu, *M'Lelland in hb. Hooker.*; Borneo, *T. Lobb.*

A very small species with short erect dense racemes. The long falcate petals are very remarkable.

141. D. SARCANTHUM; caulibus cæspitosis 3–4-phyllis, foliis angustis racemo paucifloro longioribus, bracteis (testaceis) ovario longioribus, floribus valde carnosis mento horizontali obtuso, labelli 3-partiti sagittati axi elevata truncata lobis subæqualibus lateralibus oblongis intermedio ovato.

Java, *T. Lobb,* 406, *in hb. Hooker.*

It is not certain where this curious little species was found. The whole plant is only 2 inches high with slender 3- or 4-leaved stems. The rachis is very zigzag, the flowers apparently pale yellow. I have only examined a bud, the extreme softness of which rendered it difficult to dissect.

142. D. chlorops, *Lindl. in Bot. Reg.* 1844, *Misc.* 54. (D. barbatulum, *Wight, Ic.* iii. 909.)

Concan, *Law in hb. Hooker* (21); common on trees in both Concans, in the cold season, *Stocks, in hb. Hooker.*

Flowers small, yellow tinged with green.

143. D. barbatulum, *Lindl. Gen. & Sp. Orch.* No. 44; *Paxton's Fl. Gard.* 502. *Ic. Xyl.*

Concan, *Law, in hb. Hooker.* (3); trees in the S. Concan, *Dalzell, in herb. Stocks.* (32).

The woodcut in Paxton's Flower Garden shows how different this species is from the last.

§ X. CERATOBIUM.

No species of this fine division has been yet seen in continental India. Of one I have a leaf 18 inches long by 14 broad, found in Borneo by Lobb, the flowers of which are unknown; and the following undescribed species occurs among Reinwardt's drawings.

144. D. BICAUDATUM (*Reinwdt.* MSS.); foliis oblongis acutis racemis horizontalibus 4-5-floris subæqualibus, petalis linearibus spathulatis erectis sepalis multo longioribus, labelli trilobi lobis lateralibus incurvis intermedio subrotundo minoribus.

Java, *Reinwardt.*

Flowers yellowish striped with green. Lip delicately marked

with red transverse veins. Apparently the axis is fleshy, elevated, and extended as far as the point of the lip.

Obs.—Dendr. pumilum, Roxb. Fl. Ind. 479, is not the plant so called by Griffith, if the statement in the former work can be trusted; but the specific character and description are so much at variance, that some error of the Indian transcriber is to be suspected.

D. crepidatum, Griff. Notul. iii. p. 319, is quite different from the species so named by me. But the printed description is so confused and self-contradictory, that I have not been able to identify the species.

Prof. Reichenbach reduces the genera Cadetia, Latouria, and Dichopus to the present genus. I have examined no specimens of them.

Cryptochilus, *Wallich.*

145. C. sanguinea (*Id.*); calyce oblongo bis longiore quam lato laciniis acuminatis, petalis labelloque obovatis acutis, polliniis viridibus.
Khasija, Churra Punjee, *Griffith*, at an elevation of 4000–5000 feet, *J. D. H. & T. T.* (200); Sikkim, *J. D. H., Cathcart.*

Flowers crimson. Capsule pyriform, strongly and equally six-ribbed.

146. C. lutea; calyce ovato longitudine et latitudine æqualibus laciniis triangularibus, petalis labelloque lanceolatis, polliniis luteis.
Mishmee, *Griffith*; Darjeeling, *Id.*; Sikkim, *Cathcart.*

This very distinct species occurs only among my specimens from Griffith and in Cathcart's drawings, according to which the flowers are of one uniform clear-yellow colour. Calyx much contracted at the mouth, and not at all longer than broad; petals linear-lanceolate; lip lanceolate. Pollen-masses yellow, not green as in the last. Capsule obscurely six-ribbed. I can find no trace of this remarkable plant among Griffith's descriptions or notes.

Acanthophippium, *Blume.*

147. A. sylhetense, *Lindl. Gen. & Sp. Orch.* 177. (A. ringiflorum, *Griffith, Notul.* iii. 347. *Ic.* 325.)
Sikkim, *Cathcart*; Khasija, at the elevation of 2000–3000 feet, *J. D. H. & T. T.* (198).

Flowers straw-colour, freckled with red inside.

ANTHOGONIUM, *Wallich.*

148. A. gracile, *Wall. Cat.* 7398; *Rchb. fil. in Allg. Gartenzeit,* July 1856; *Bonplandia,* Oct. 15, 1856; *Griffith, Notul.* iii. 383, *Ic.* 345. (A. Griffithi, *Rchb. f. in Bonplandia.*)
Khasija, grassy places, 4000–6000 feet, *J. D. H. & T. T.* (199), *Lobb*; Assam, *Griffith.*

This plant varies in the breadth of the leaves, which are sometimes 9 lines and sometimes only 2 lines wide. I can find no ground for the separation of *A. Griffithi,* whose original specimens are before me.

SPATHOGLOTTIS, *Blume.*

149. S. ixioides, *Lindl. Gen. & Sp. Orch.* p. 120.
Sikkim, at an elevation of 8000–10,000 feet, *J. D. H.* (146).

"Flowers yellow." *J. D. H.*

150. S. pubescens, *Lindl.* l. c.
Khasija, *Lobb*; grassy hills at 5000–6000 feet, *J. D. H.* (145).

"Flowers yellow," *J. D. H.* I fear my Chinese *Sp. Fortuni* (Bot. Reg. 1845, t. 19) is not distinct from this, which varies greatly in the breadth of its leaves and the form of the petals.

151. S. parvifolia, *Lindl. in Bot. Reg.* 1845, sub t. 19. (S. Khasijana, *Griff. Not.* p. 323, *Ic.* t. 311. 1.
Khasija, on dry rocks near Churru, also in Assam, *Griffith.*

N. B. *Spathoglottis? trivalvis* of Wallich's Cat., No. 3742, the fruit of which alone is known, Prof. Reichenbach, jun. refers, and probably with justice, to *Acriopsis.* Griffith's *Sp. lilacina,* Not. p. 325, Ic. t. 311. 3, is *Sp. plicata*; the same author's *Sp. plicata* is *Sp. aurea.*

ARUNDINA, *Blume.*

152. A. bambusifolia, *Lindl. Gen. & Sp. Orch.* 125.
Khasija, 2000–3000 feet, *J. D. H.* (149); hot valleys, Sikkim, *Id.*

153. A. affinis, *Griffith, Notul.* iii. 330.
Khasija, at an elevation of 3000 feet, in shady wet places, on rocks near streams, *J. D. H.* (151); Churra Punjee, *Griffith.*

"Labellum yellow inside." Very like *A. chinensis,* from which it seems to differ in having only two ragged lamellæ on the lip instead of five, the lateral and middle of which are shortest. My specimens are from Griffith himself.

154. A speciosa, *Blume*. (Cymbidium speciosum, *Hb. Reinwardt.*)
Java, *Lobb* (217); Goorgong, Assam, *Griffith*; common in rocky places in wet situations on Mt. Ophir, at the height of 2500 feet, where it is called Paddam Bhattoo, *Id.*

This is principally distinguished from *A. bambusifolia* by the terminal lobes of its lip being parallel and overlapping each other, while in *A. bambusifolia* they divaricate. *A. affinis* has smaller flowers and narrower petals. *A. densa* is much more distinct, its flowers being closely arranged, and the middle lobe of the lip almost obsolete.

Nephelaphyllum, *Blume*.

155. N. cordifolium. (Cytheris cordifolia, *Lindl. Gen. & Sp.* p. 128.)
Khasija, at 4000 feet, *J. D. H.* (147).

"Flowers pale green, striped with pale purple; lip pale purple." *J. D. H.* These specimens are much larger than Wallich's from Silhet. The plant appears to spread and creep among moss, through which the leaves and flowering stem arise. In *N. tenuiflorum*, Bl., which resembles this, the flowers are much smaller as well as more numerous, and the leaves are frequently almost truncate at the base. *N. pulchrum*, Bl., which is the *Limodorum maculatum* of Reinwardt's unpublished drawings, is much dwarfer, the scape not being longer than the leaves, which are purple beneath, clouded with varying tints of green on the upper side, and in form oval-acuminate; the flowers are straw-coloured with a purple spur and a yellow crest in the middle of an undivided lip. The genus certainly belongs to *Epidendreæ*, in the neighbourhood of *Bletia*.

Eulophia, *R. Br.*

156. E. bracteosa, *Lindl. in Wall. Cat.* No. 7366. (E. grandiflora, *Id. Gen. & Sp.* p. 181.)
Khasija, at 2000 feet, *J. D. H. & T. T.* (222).

Further examination has satisfied me that there is no difference between the above two supposed species. I even doubt whether there has not been some error in making *E. grandiflora* a native of Ceylon.

157. E. graminea, *Lindl.* l. c. No. 13.
Malacca, *Cuming*; Burma, at Amherst, in woods near the sea, *Griffith*; plains of Behar, *J. D. H. & T. T.* (221).

This must no longer be regarded as a Malay plant, the specimens from Behar differing in nothing except the flowers being rather smaller, with the lip less deeply 3-lobed.

158. E. inconspicua, *Griffith, Not.* iii. 349. t. 326.

This Malacca plant I have not seen. It seems to differ from the last in little beyond the processes on the labellum.

159. E. BRACHYPETALA; foliis oblongo-lanceolatis, scapi vaginis 2 longis membranaceis, racemo raro secundo, sepalis erectis lineari-lanceolatis, petalis conformibus multo brevioribus, labelli trilobi venis crispulis lobis lateralibus acutis intermedio multo longiore oblongo obtuso, calcare subgloboso.

N. W. Himalaya, Gurwhal at 2000–3000 feet, *T. T.* (216).

I have not seen the pollen-masses of this plant, which might be mistaken for *Ania angustifolia.* It must be re-examined with better materials than I possess. Much like *E. Promensis*, but the lip is different.

160. E. virens, *R. Brown.*
Courtallum, *J. D. H.* (221).

161. E. herbacea, *Lindl.* l. c. (E. albiflora, *Edgeworth*, MSS.)
Himalayas, *Edgeworth, in hb. Bentham.*; Concan, *Law, in hb. Hooker.* (220).

The long green narrow sepals, the much broader and shorter petals, and the fringed veins of the lip are peculiar.

162. E. OCHREATA; foliis oblongis acutis, scapo laxe trivaginato, bracteis linearibus acuminatis ovariis longioribus, racemo cylindraceo, sepalis ovalibus acutis concavis, petalis planis latioribus, labello oblongo serrato venis omnibus fimbriatis, calcare parvo hemisphærico.

Concan, *Law, in hb. Hooker.*; Canara, *Stocks* (71).

A small-flowered species with a rather dense cylindrical raceme 4 or 5 inches long. All the parts of the flower membranous.

163. E. bicolor, *Dalzell, in Hooker's Journ.* iii. 43.
Western Ghauts, *Dalzell, in hb. Stocks.* (23); Concan, *Law, in hb. Hooker.*

Much like *E. herbacea*; but the spike is longer and more slender, and the flowers are not half the size. Moreover the spur is longer, and the middle lobe of the lip obovate with long fringes on the veins.

164. E. campestris, *Lindl.* l. c. (E. ramentacea, *Wight, Ic.* 666.)
Western India, *Jacquemont* (653 *in Herb. Mus. Par.*); plains of Rohilcund, *T. T.* (218).

Both these, especially Jacquemont's plant, are taller and more slender than Wallich's Oude specimens, but do not appear to differ otherwise.

165. E. HEMILEUCA; aphylla, vaginis 4 apice herbaceis, racemis longis laxis subsecundis, sepalis lineari-lanceolatis herbaceis, petalis latioribus planis, labelli trilobi laciniis lateralibus apice rectangulis acutis intermedia concava crispa, ramentis venarum paucis sparsis, calcare brevi conico.

Plains of Rohilcund, *T. T.* (219).

Sepals green, petals white. The lip is very membranous, with a very few scattered ramenta on the veins of the middle lobe. Next *E. campestris.*

166. E. PRATENSIS; aphylla, vaginis caulis 5 acutissimis, racemo laxo multifloro, sepalis petalisque brevioribus oblongis acutis, labello oblato 3-lobo laciniis lateralibus ovatis obtusis intermediæ ovatæ obtusæ subæqualibus venis tribus cristatis, calcare brevi conico obtuso.

Pasture lands in the Deccan, in the cold season, *Stocks* (22 bis. E. virens, *in herb. Hooker.*).

Quite a different plant from *E. virens*, to which Stocks referred it, known at sight by its short oblong sepals, still shorter petals, and obtuse 3-lobed 3-crested lip.

167. E. DENSIFLORA; aphylla, vaginis pluribus obtusis, racemo denso, bracteis inferioribus herbaceis ovario longioribus, sepalis petalisque lineari-lanceolatis his brevioribus, labelli trilobi calcare conico lobis lateralibus rotundatis intermedio ovato crispo, venis tribus fimbriatis, ovario calcaris longitudine.

Bootan, *Griffith.*

I have this by favour of the East India Company, through the good offices of Dr. Royle. It is much larger in all its parts than any other of the aphyllous section. The ovary is not at all longer than the spur.

168. E. ramentacea, *Lindl.* l. c. (not *Wight*).

Bootan, *Griffith.*

169. E. rupestris, *Lindl.* l. c.

N. W. Himalayas, *Royle, Jacquemont, Herb. Mus. Par.* (53, 47).

170. E. HASTATA; aphylla, racemis gracilibus densis multifloris, bracteis setaceis ovario brevioribus, sepalis petalisque linearibus distantibus acuminatis, labello unguiculato hastato trilobo acuminato lamellis 2 altis integris supra unguem ortis ad sinus evanescentibus, calcare brevi oblongo.

Assam, *Griffith.*

The flowers are smaller than in any other of the aphyllous species. The nearly hastate lip, the side lobes curving forwards, and the two deep lamellæ beginning above the unguis and vanishing into mere lines opposite the re-entering angles, are unlike anything else in the genus.

171. E. STENOPETALA; aphylla, scapo gracili 3–4-vaginato, racemo brevi, bracteis ovatis acuminatis incurvis ovario longioribus, sepalis secundis petalisque porrectis linearibus æqualibus, labello infundibulari: limbi trilobi lobis lateralibus rectangulis intermedio subrotundo crispo ramentis 3 parvis fissis sinubus oppositis, calcare elongato apice inflato, foliis hysteranthiis gramineis.

Bootan; Panukka on dry hills, *Griffith* (847, *Itinerary Notes*, p. 164).

Authentic specimens, sent me by Griffith himself, show this to be a slender plant, with a graceful scape 18 inches high, terminated by from 5 to 8 flowers, with large herbaceous bracts ending in fine points. According to Griffith's Itinerary, the flowers are purplish with darker veins; at least such seems to have been written by that lamented botanist, as far as can be judged from the wretched state of the printed text.

CORALLORHIZA, *Haller*.

172. C. INDICA: floribus subglobosis, sepalis petalisque oblongis æqualibus secundis obtusis, labello unguiculato concavo reflexo lamina subrotundo-quadrata utrinque medio unidentata intus nuda.

N. W. Himalaya; upper part of Hattee? *T. T.* (no number).

A solitary specimen, found by Dr. Thomson, is before me. It has no root, a stout scape a foot high with two distant close-pressed sheaths, a loose spike of 7 flowers, with linear acuminate spreading bracts, the lower of which are empty. The flowers are about $\frac{3}{4}$ inch in diameter. The only flower I have been able to dissect had lost anther and pollen-masses; but I think the plant must belong to the present genus.

The leafy Corallorhizas formerly published by me I have now had better means of examining. *C. foliosa* I have redissected; and a second species, from Dr. Thomson, has proved to be in a good examinable state. In both, the pollen-masses are globular, not at all compressed, and in the latter I have found them attached to a true caudicle with its gland. It is therefore clear that they must be separated from Corallorhiza and placed near Eulophia, from which their pollen-masses distinguish them. A third species is the Siberian *Corallorhiza patens*. The alpine habits of all lead me to propose the name of *Oreorchis* for this small group.

OREORCHIS, gen. nov.

Tuberosa. *Folia* angusta radicalia plicata. *Scapi* simplices distantes vaginati, apice dense racemosi. *Sepala et petala* subæqualia secunda, lateralia basi obliqua. *Labellum* unguiculatum

cum columna continuum tripartitum membranaceum intus bicarinatum. *Columna* elongata marginata, stigmate excavato. *Pollinia* 4, globosa, disjuncta, caudicula lineari, glandula carnosa.

173. O. FOLIOSA; sepalis petalisque oblongo-linearibus, labelli lobis lateralibus ovatis obtusis medianis, carinulis parallelis membranaceis. —Corallorhiza with leaves, *Lindl. in Royle's Botany of the Himalayas*, p. 362.

Mussooree, *Royle*; Lachen in Sikkim, at 11,000–12,000 feet, *J. D. H.* (213), rare.

Sepals red; labellum white dabbled with red. Tuber roundish, the size of sparrow's egg. Leaves from 5 to 15 inches long. Flowers small, somewhat secund. In my sketch of Dr. Royle's plant the lip has two distinct parallel carinulæ terminating opposite the re-entering angles of the lip: in the only imperfect flower from Sikkim which it has been possible to dissect, the carinulæ are short, broad, and acute; yet the plants are indubitably the same.

174. O. MICRANTHA; tubere foliis scapoque præcedentis, labelli lobis lateralibus filiformibus basilaribus intermedio apice lunato crispo basi appendice cochleari carnosa instructo.

N. W. Himalayas, 8000–10,000 feet; Yaklul Mountain, Kumaon, *T. T.* (214).

Habit exactly that of the last. Flowers not a quarter the size; petals broader than the sepals. Pollen-masses 4, globular, perfectly distinct, on the end of a spathulate caudicle, connected with an oblong fleshy gland. Capsules pendulous, oval, mucronate, not dehiscent in the plant before me.

175. O. PATENS; tuberibus ovatis monophyllis in rhizoma approximatis, folio (latiore), scapi vagina in medio lineari herbacea patente, labelli lobis lateralibus linearibus supra basin enatis carinulis 2 clavatis distantibus.—Corallorhiza patens, *Lindl. Gen. & Sp.* 535.

Siberia, *Prescott*.

Flowers intermediate in size between the two preceding; lateral lobes of the lip springing neither from the base nor above the middle, but below the middle.

CYMBIDIUM, *Swz.*

176. C. aloifolium, *Swartz*; *Wight, Ic.* 1687??

Nilgherries, *J. D. H.* (234); Sikkim, 1000–3000 feet, *J. D. H.* (228).

The racemes in the Sikkim plant are short, the flowers are rather more fleshy, and the lip shorter than in the southern form. There is however a drawing in Cathcart's collection representing

a plant with leaves 2 feet long, 1¾ broad, and a raceme almost as dense as in *C. elegans*. Wight's figure resembles *C. pendulum*; but that does not seem to be a continental species. *C. erectum* (Wight, Ic. 1753) is very near this; I have not seen it.

177. C. cyperifolium, *Wallich, Cat.* No. 7353. (Cymbidium viridiflorum, *Griff. Itin. Notes*, p. 126, No. 454.)
Khasija, *J. D. H. & T. T.* (267); Bootan, *Griffith.*

The long leaves of this resemble those of some Carex; its long linear-lanceolate bracts far overtopping the flowers; and the linear distant straight lamellæ are quite peculiar.

178. C. COCHLEARE; foliis longissimis angustissimis caricinis, racemo debili multifloro, bracteis obsoletis, sepalis petalisque linearibus acuminatis, labello angusto versus apicem dilatato trilobo lamellis in cochlear semiliberum apice confluentibus.
Sikkim, in hot valleys, *J. D. H.* (235).

The habit is that of *C. cyperifolium*; but the bracts are almost obsolete, the very narrow sepals, petals, lip, and column are full 2 inches long, and the lamellæ of the perfectly bald lip are united into a spoon-shaped process attached by its middle. The form of the end of the lip is unknown to me.

179. C. eburneum, *Lindl. in Bot. Reg.* 1847, t. 67. (C. syringodorum, *Griff. Not.* iii. 338.)
Khasija mountains, Myrung, *Griffith.*

180. C. affine, *Griffith, Not.* iii. 336, t. 291.
Khasija hills, Surureem, *Griffith.*

It is impossible to reconcile the statements made for Griffith by his editor, without assuming that some confusion of papers has taken place. This plant, which I have from himself with his own name, is evidently that to which the second description of his *C. densiflorum* applies, and has nothing to do with the first description, which applies either to a variety of *C. elegans*, or to something very near it. The hairy middle lobe of the lip assists in distinguishing this from *C. elegans*, to which it approaches.

181. C. elegans, *Lindl. Gen. & Sp. Orch.* 163, No. 9, *Sertum Orchidaceum*, t. 14. (Cyperorchis elegans, *Blume, Mus. Lugd. Bot.* i. 48. C. densiflorum, *Griffith, Not.* iii. 337, so far as the first description goes.)
Khasija hills, 5000–6000 feet, *J. D. H. & T. T.* (231); Myrung, *Griffith*; Darjeeling, *Id.*; Sikkim, *Cathcart*, 5000–8000 feet, *J. D. H.* (232).

This species varies greatly in the number of orange-yellow flowers

collected in its great oblong nodding racemes. In all states it is to be known by the connivent sepals and petals, and probably also by the presence of a pair of teeth near the base of the two contiguous parallel lamellæ. I must however observe, that I cannot find the latter in my specimens of *C. densiflorum*, from Griffith, although he describes them as being present.

182. C. longifolium, *D. Don*; *Lindl.*, l. c.
Sikkim, *Cathcart*; Khasija, *J. D. H. & T. T.* (230).

Flowers appear, from Cathcart's figure, to be olive-brown, with a white lip spotted with crimson. The lip is covered with down in the inside, and the appearance of the species is that of a small *C. giganteum*.

183. C. giganteum, *Wall. Cat.* No. 7355; *Bot. Mag.* 4844.
Khasija, Nunklow on trees, *Griffith*; Darjeeling, *Id.*; Sikkim, 5000–7000 feet, *J. D. H.* (227, 233).

Varies much in the size and colour of the flowers and the breadth of the leaves. Among Cathcart's drawings, one represents them as dull red on a greenish ground, with the inside of the lip streaked with red, the whole flower being about 3 inches in diameter; another, on the contrary, represents them as nearly 5 inches in diameter, with deep bright-green whole-coloured sepals and petals, and a yellowish lip, the inside of which is profusely dotted with crimson.

184. C. MICROMESON; foliis linearibus loratis basi canaliculatis rigidis racemo erecto paucifloro longioribus, perianthio membranaceo patente, labello cuneato glaberrimo basi conspicue saccato laciniis lateralibus rotundatis intermedia unguiculata oblata biloba apiculata multo minore lamellas 2 filiformes crenulatas emittente versus medium labellum evanescentes.
Khasija, *Griffith*.

For this curious species I am indebted to the East India Company, by whom it was communicated with many other of Griffith's plants, through my friend Dr. Royle. The great bag formed between the bases of the column, lip, and lateral sepals, the long lip smooth, wedge-shaped, with a very small double purple middle lobe, from which run down two smooth crenated lamellæ, disappearing before they reach the middle of the lip, are like nothing else in this genus.

185. C. chloranthum, *Lindl. in Bot. Reg.* 1843, *Misc.* 102. (C. variciferum, *Rchb. f. in Bonplandia*, Oct. 15, 1856.)

This is not among the collections before me. I learn from Prof. Reichenbach himself that his name has to be cancelled.

186. C. sinense, *Willd.*
Khasija, at 1500 feet, *J. D. H. & T. T.* (226).

This does not seem to differ from the Chinese plant.

187. C. ERYTHRÆUM; foliis angustis acutis racemis multifloris brevioribus, bracteis minutis, sepalis lanceolatis, petalis angustioribus patentissimis falcatis, labello convoluto intus tomentoso apice æqualiter trilobo laciniis rotundatis recurvis lateralibus planis intermedia crispa lamellis contiguis rectilineis pilosis apice confluentibus.
Sikkim, in hot valleys, *J. D. H.* (229).

"Panicle varies in length and density, flowers in size and colour. Upper and back part of column grows over stigma, and whole column very much incrassated." *J. D. H.*—From the sketches of Dr. Hooker I learn that the sepals of this fine species are spreading, oblong-lanceolate, green with dull-red broken streaks; the petals somewhat narrower, rose-coloured, and curved backwards; the lip yellow, with numerous red streaks on the outside and inside. In the dried flowers the sepals are two inches long.

188. C. lancifolium, *Hooker, Exot. Fl.* t. 51. (C. Gibsoni, *Paxton, Fl. Garden,* No. 618, *Ic. Xyl.* 301?—C. javanicum, *Blume, Bijdr.* 380.)
Khasija, at 4000–5000 feet, *J. D. H. & T. T.* (139); Mishmee hills, lower ranges, *Griffith*; Sikkim, *Cathcart*; Java, *T. Lobb* (187), *Reinwardt* ("C. vaginatum").

This plant has not appeared among the Hindostan collections, but it seems to be common in the North-eastern Provinces, its track then bending downwards into the Indian Archipelago. That it exists in Java is shown by the specimens above-mentioned from T. Lobb and Reinwardt. Of the only other two Javanese Cymbids that I have seen, one is a grassy-leaved plant allied to *C. ensifolium,* the other is possibly Prof. Blume's *C. cuspidatum*; but nothing certain can be said without examining authentic specimens. *C. Gibsoni* is only a half-monstrous state of this.

CREMASTRA, *Lindl. Gen. & Sp.* p. 172.

189. C. Wallichiana, *Id.* l. c.
Sikkim, at 7000 feet, *J. D. H.* (242).

Blume's figure of the Japanese *Hyacinthorchis variabilis* (Mus. Lugd. Bot. i. t. 16) differs in no respect whatever from the Indian plant, except in having a short shrivelled appendage of the lip instead of a long cucullate one. If this is really so, the species would seem to be distinct; if not, not.

Cyrtopera, *Lindl.*

190. C. bicarinata, *Lindl. Gen. & Sp. Orch.* 189.

Griffith's *Cymbidium*, Not. iii. 343, No. 9, is certainly this, and it is to that description, not to No. 8, that his figure 319 belongs. The description of No. 8 has nothing to do with any species of Cymbidium, Eulophia, or Cyrtopera.

191. C. candida; foliis oblongis acutis petiolo æqualibus, bracteis subulatis ovario æqualibus, sepalis lineari-lanceolatis, petalis oblongis apiculatis brevioribus duplo latioribus, labelli trilobi lobis lateralibus ovatis obtusis intermedio subrotundo crispo apiculato recurvo multo brevioribus tuberculis 2 rotundis versus basin venisque 3 majoribus carnosis elevatis.

Sikkim, *Cathcart, J. D. H.* (241).

Corm orbicular, covered with coarse shreds. Flowers rather before the leaves, greenish white, except the sepals, which are herbaceous. The base of the column is saccate, but the lip is merely concave. Anther fleshy, triangular, stained with crimson. In a dried state it is much like *C. tricarinata.*

192. C. fusca, *Wight, Ic.* t. 1690.

Nilgherries, *J. D. H.* (215).

Wight's figure is a good one, except that the lower half of the veins on the lip is represented as scabrous, like the upper half, while in reality it is perfectly smooth.

193. C. flava, *Lindl.* l. c. = C. Cullenii, *Wight, Ic.* 1754, no doubt.

194. C. ensiformis. (Eulophia exaltata, *Rchb. f. in Bonplandia,* Feb. 15, 1857.)

Philippines, *Cuming.*

An authentic specimen, though but a single flower, from Prof. Reichenbach, enables me to identify his *E. exaltata*, which is certainly a genuine Cyrtopera. I am unable to find on the lip the elevated keels which my learned friend describes. What I find is a somewhat fleshy middle lobe, hollowed out like a spoon, and compressed between the lateral lobes. This being smaller than some other Cyrtoperas, I am obliged to change the specific name: that of *ensiformis* indicates one main feature of the species whose leaves are as long, straight, and narrow as any Iris or Gladiolus.

195. C. squalida, *Rchb. in Bonpl.* Feb. 15, 1857. (Eulophia squalida, *Lindl. in Bot. Reg.* 1841, *Misc.* 164.)

Philippines, *Cuming*; Borneo, *T. Lobb.*

I assent to the removal of this from Eulophia, although the

short spur may almost as well be referred to the labellum as to the column.

196. C. MYSORENSIS; foliis oblongis petiolo longioribus, bracteis subulatis ovario æqualibus, sepalis lineari-lanceolatis carinatis apiculatis, petalis planis minoribus? labello oblongo indiviso crispo apiculato intus nudo.

Mysore, *Law in hb. Stocks.* (56).

A plant with the habit of *C. fusca*, but widely different in the structure of the lip. Owing to the bad state of my specimen, I am uncertain whether the petals are really much shorter than the sepals, or not.

197. C. SANGUINEA; aphylla, discolor, tubere crasso oblongo articulato, scapo trivaginato, bracteis lineari-lanceolatis ovario longioribus, sepalis oblongo-lanceolatis, petalis ovatis brevioribus, labello obsolete trilobo apice rotundato recurvo, anthera mucronata.

Sikkim, *Cathcart*; at 4000–5000 feet, *J. D. H.* (223 & 361).

Plant from 1 foot to more than 2 feet high, of one uniform dull-greenish crimson tint, except the lip, which is rose-colour. The petals are not much more than ⅔rds the length of the very acute sepals, which are rather more than 1 inch long. The inside of the lip is free from lamellæ or other processes, but is obscurely papillose on all the veins.

There is a Cyrtopera from Sumatra with dense pyramidal racemes of dull-purple flowers among Professor DeVriese's drawings, where it is called *Cymbidium geophilum*; but I have seen no specimen. It seems to be different from this.

SACCOLABIUM, *Blume.*

198. S. guttatum, *Lindl. Gen. & Sp. Orch.* 220.

Chittagong, *Col. Fielding*; Kamaon, in the Simai valley, *J. D. H.* (185); Sikkim, in hot valleys, *Id.* (184).

It may be doubted whether either *Saccolabium Blumei* (which is *S. Rheedii* of Wight's Ic.), or *S. macrostachyum* (Sertum, Orch. t. 47), are distinct from this common species, notwithstanding the difference in the form of the middle lobe of their lip and some other circumstances. At least I have from Java a plant gathered by Mr. T. Lobb, which combines the præmorse leaves of *S. guttatum* with the short spike and retuse lip of *S. Blumei.*

199. S. GURWALICUM; subacaule, radicibus maximis compressis, foliis canaliculatis distichis truncatis spicis simplicibus longioribus, sepalis petalisque obtusis, labelli calcare late conico rotundato compresso

intus hirto lamina carnosa concava unguiculata subtriloba, fructu ovali brevi trialato ligneo.

Gurwhal, N.W. Himalaya, at 3000 feet of elevation, *T. Thomson* (181); Gunai valley, Kamaon, *Id.* (185).

A very distinct plant, nearly allied to *S. guttatum*. The raceme in my specimen is not more than 3 inches long, and very dense; the lateral sepals are considerably larger than the petals and dorsal sepal. The ripe fruit is not above a quarter the size of that of *S. guttatum*, almost exactly oval, and much harder.

200. S. calceolare, *Lindl.* l. c.; *Griff. Notul.* iii. 356. t. 334. (Vanda pulchella, *Wight, Ic.* t. 1671.)

Base of Khasija, *J. D. H. & T. T.* (187); Sikkim, in hot valleys, *Id.* (187), *Cathcart*; Java, *T. Lobb.* (339.)

A most variable plant, constant in little except the extremely acuminate unequal-sided points of the leaves. The middle lobe of the lip is sometimes a mere ciliated rim, sometimes a deep triangular fringed plate, and occasionally quite entire. The leaves vary in breadth from $\frac{1}{3}$th of an inch, as in Griffith's figure, to $\frac{3}{4}$ths, as in Hooker's Khasija specimens. The Java plant has the leaves less unequal at the end, and acuminate, and appears to be smaller than the Indian forms, one of my specimens not being more than $\frac{1}{2}$ inch high. In all cases the flowers would seem to be spotted, with the sepals and petals fleshy and oblong.

201. S. obliquum, *Lindl.* l. c.

Khasija, *J. D. H. & T. T.* (189).

A careful examination of flowers in spirits does not enable me to point out any important distinction between this and *S. calceolare*; so that the broad leaves with very blunt ends afford the only available specific character. Dr. Hooker writes on his label, "flowers exactly as in 188 (*S. calceolare*), but larger and whiter." The sepals and petals appear to be also narrower.

202. S. intermedium, *Griff.* MSS. (Sacc. no. 4, *Griff. Not.* iii. 357).

Khasija hills: Moosmai, Oct. 1835, *Griffith*.

I have this from the author. It is much like *S. calceolare*, but is more caulescent and more fleshy, with scarcely any appearance of a second lobe on the thin extremely acuminate end. The flowers are not half the size, with much narrower sepals and petals. The lip is, moreover, almost exactly hemispherical. It seems distinct.

203. S. acutifolium, *Lindl.* l. c. (S. denticulatum, *Paxton, Mag. Bot.* vii. 145; *Bot. Mag.* t. 4772.—Saccolabium, *Griff. Itin. Not.* p. 46, no. 713; *Notul.* iii. t. 333.)

Sikkim, *Cathcart*; at 5000 feet, *J. D. H.* (367); Khasija, *Griffith*.

This has numerous flowers on long stalks at the end of a stout peduncle; and the very fleshy leaves are convex and acute. It is also quite different from *S. calceolare* in its decidedly caulescent habit. The flowers are whole-coloured, yellowish-brown, unspotted, with the lamina of the lip broad, triangular, and marked with a circular collection of crimson spots in the very disk. Griffith's plant is a narrow-leaved small state, as compared with the Sikkim form, which has twenty flowers at the end of a stout peduncle 2½ inches long. I have seen no specimen; and the Indian drawing, after which the definition in the Gen. & Sp. was prepared, seems to have been misunderstood.

No Indian collection yet examined by me has contained a plant that answers to the account of *S. dasypogon.*

204. S. micranthum, *Lindl.* l. c.
Bootan, *Griffith*; Mergui, *Id.*

205. S niveum, *Lindl*, l. c.
Ceylon, *Thwaites*, in the Hewahette district.

206. S. gemmatum, *Lindl. in Bot. Reg.* 1838, *misc.* 88; *Rchb. fil. in Bonplandia*, Oct. 15, 1856.
Sikkim, at 4000–6000 feet, *J. D. H.* (209); Ceylon, *Gardner, in hb. Hooker*. (872).

This has much the appearance of the last; but the petals are short and obtuse, the leaves much broader, the racemes longer, and the flowers blood-red, except the lamina of the lip, which is white, with the two lateral short lobes greenish, succulent, and resembling oblong glands. The flowers are scentless (*J. D. H.*). I have it from Griffith without locality.

207. S. PACHYGLOSSUM; foliis semiteretibus spicis paniculatis subæqualibus, sepalis carinatis oblongo-linearibus apice secundis, petalis linearibus, labelli calcare oblongo leviter arcuato limbo carnoso unguiculato apice dilatato plano-subrotundo dorso convexo.
Borneo, *T. Lobb.*

Flowers not half as large as in the two last, which it much resembles. Sepals remarkably fleshy, narrow, with their points recurved, while from between the laterals projects the lamina of the labellum in the form of a minute spoon.

208. S. RAMULOSUM; caulescens ramosum, foliis semiteretibus angustissimis recurvis, floribus (minutis) paniculatis clausis carnosis, sepalis oblongis carinatis, petalis brevioribus retusis, labello apice plano-convexo calcare oblongo.—*Schœnorchis paniculata*, Blume, Bijdr. 362.
Java, *De Vriese.*

This wants the peculiar column of Schœnorchis, and is in no respect distinguishable from Saccolabium. The leaves seem to vary much in size.

209. S. CHIONANTHUM; foliis teretibus recurvis spicis simplicibus æqualibus, floribus (minutis) carnosis, sepalis obtuse carinatis petalisque minoribus apiculatis, labello apice appendice plano-convexa triangulari instructo calcare horizontali oblongo, anthera apice lineari elongata erecta.—*Schœnorchis micrantha*, Blume, *l. c.*
Java, *Reinwardt.*

Like the last, this is quite without the essential character of Schœnorchis. The whole plant is only 4 or 5 inches long, with minute snow-white flowers.

210. S. ampullaceum, *Lindl. in Sert. Orch.* t. 17. (S. rubrum, *Id. Gen. & Sp.* no. 11.—Aerides ampullaceum, *Roxb. Fl. Ind.* iii. 476.)
Sikkim, in hot valleys, *J. D. H.* (196).

The flowers are rather larger than in Wallich's specimens. *S. miniatum* (Bot. Reg. 1848, t. 58) differs in little except colour, varying greatly in the size of its flowers.

211. S. brevifolium, *Lindl.* l. c. no. 27.
Ceylon, *Thwaites* (488.—S. virescens, *Gardner* MSS.), *Gardner* (871).

The form sent from Ceylon by Thwaites appears to be identical with the original plant, except in having the flowers green instead of red.

212. S. gracile, *Lindl.* l. c.
Ceylon, *Gardner* (869); Hautane, *Champion.*

213. S. PALLENS (*Cathcart,* MSS.); caulibus longis pendulis ramosis radicantibus, foliis carnosis loratis oblique obtusis, racemis axillaribus laxis flexuosis foliis brevioribus, sepalis petalisque oblongis æqualibus, calcare cornuto duplo longiore, limbi 3-lobi laciniis parvis subæqualibus lateralibus rotundatis intermedia acuta.
Sikkim, *Cathcart.*

I have seen no specimen of what seems a very distinct and handsome species; the above description is taken from a figure of Mr. Cathcart. The plant is represented as having branches 9 inches long, protruding strong free flexible roots as long or longer than themselves, leaves 8 inches, and loose zigzag racemes 4–5 inches. The flowers are whitish, with a pink line in the middle of each sepal and petal, and on the outside of the long curved spur. It is very near the next species; but the flowers are much larger, and the middle lobe of the lip, instead of being as long as the spur, is merely a triangular point.

214. S. Wightianum, *Lindl.* l. c.; *Wight, Ic.* t. 917. (Aerides radicosum, *A. Rich. in Ann. Sc.* 2 ser. xv. p. 65, t. 1. fig. C.
Courtallum, *Wight* (907); Nilgherries, *Perrottet* (75 *Herb. Mus. Par.*); Khasija, *T. Lobb.*

Like the last, except in the circumstances already mentioned. In my specimen the lip has sharp lateral triangular lobes, and a middle one acute, rather fleshy towards the base, but thin and slightly crenulate above the middle. A. Richard's plant, which came from the neighbourhood of Ootacamund, is certainly to be referred here.

215. S. DISTICHUM; caulibus elongatis filiformibus, foliis lanceolatis setaceo-acuminatis distichis, pedunculis paucifloris terminalibus et axillaribus, sepalis petalisque oblongis carnosissimis, labello calceolari lobo medio semicirculari membranaceo acuto disco didymo carnoso.
Sikkim, 6000–8000 feet, *J. D. H.* (206); Khasija, 5000–6000 feet, *Id.* (83).

A very peculiar species, probably most nearly allied to *S. acutifolium*, and remarkable for its long weak stems and fleshy distichous leaves about an inch long. The middle lobe of the lip is not exterior to the two others, and it has a remarkable glandular convex double disk.

216. S. ringens, *Lindl.* l. c., is S. rubrum, *Wight, Ic.* t. 1673, a good figure, but not the plant of the Genera and Species Orch.

217. S. VIRIDIFLORUM; acaule, foliis (2) oblongis planis obtusis emarginatis, pedunculo laterali bivaginato paucifloro foliis multo breviore, sepalis petalisque unguiculatis obtusis, labello ovali nudo calcare infundibulari incurvo æquali. Micropera viridiflora, *Dalzell, in Hooker's Journal*, iii. 282.
Western India, *Dalzell, in hb. Hooker.*

Very near *Œceoclades pusilla*, but with much shorter spikes, and fleshy, not membranous, flowers. This *Œ. pusilla*, with *flexuosa, paniculata* (*Sacc. parvulum*, m.), and perhaps *tenera*, are Saccolabia, while others are certainly *Angræca*; and it is probable that *Œ. maculata* is the only plant to which the generic name will attach.

Note.—The *Sarcanthus roseus*, Wight, Ic. 1685, and *filiformis*, Ic. 1684, are certainly species of this genus, and perhaps not distinct from each other. I have seen no specimens.

Saccolabium papillosum of the same author, Ic. 1672, is not *Acampe papillosa*, nor do I recognize it.

PODOCHILUS, *Blume*.

218. P. densiflorus, *Bl. Rumphia*, iv. p. 43.
Borneo, *T. Lobb.*

219. P. lucescens, *Blume, Bijdr.* 295, t. 12.
Borneo, in Sarawak, *T. Lobb.*

The unguiculate labellum, with a pair of appendages at its base, and the absence of all cohesion between the labellum and lateral sepals, are characters at variance with the usual structure of this genus; and yet it is the original typical species.

220. P. cultratus, *Lindl. Gen. & Sp.* p. 234.
Sikkim, in hot valleys, *J. D. H.* (1); Assam, *Griffith, Masters.*

It is remarkable that all the specimens examined by me continue to be without flowers.

221. P. microphyllus, *Lindl.* l. c.
Khasija, at 3000 feet, *J. D. H.* (84); Penang, *Gaudichaud.*

Blume's *P. scalpellifolius*, which I have not seen, if accurately dissected by his artist, differs in the lip being linear, not broad at the base, and cordate; and in the sepals being almost wholly united, like some species of Tæniophyllum. In general appearance it is undistinguishable from this.

Note.—Blume's *Cryptoglottis serpyllifolia*, which I have from T. Lobb, gathered in Borneo, is only a Podochilus with an excessive development of the lateral sepals into a long spur: the basal processes of the lip are analogous to those of *Podochilus lucescens.*

Camarotis, *Lindl. Gen. & Sp.* p. 219.

222. C. purpurea, *Lindl.* l. c. Sertum Orch. t. 19.
E. Bengal, Chittagong, and base of Khasija, *J. D. H. & T. T.* (186).

223. C. pallida. (Micropera pallida, *Lindl.* l. c.)

This is not among the collections recently placed in my hands. It is undoubtedly nothing more than a Camarotis.

224. C. philippinensis; folio oblongo oblique obtuso, racemis arcuatis multifloris, sepalis lateralibus liberis labello suppositis, labello subtriangulari saccato-cucullato apice carnoso tridentato incurvo.
Philippines, *Cuming.*

Flowers larger than in either of the former, somewhat triangular in the bud, apparently fleshy. There is no adhesion between the sepals and labellum, as in *C. purpurea* and *pallida*, on which account the generic character requires to be modified; and the same is the case in my *Saccolabium fasciculatum*, as Prof. Reichenbach has suggested, if indeed the leaves and loose flowers of that species really belong to the same plant.

MICROPERA, *Dalzell*.

225. M. maculata, *Dalzell, in Hooker's Journal,* iii. 282.

On trees near Tulkut, in the Western Ghauts, in lat. 16° N., *Dalzell, in hb. Stocks.* (25).

I have already stated that my genus Micropera must be reduced to Camarotis. The present plant, which seems not to be referable to any known genus, may as well, however, retain the name. Mr. Dallzell's account of it is good as far as it goes, describing correctly the very curious lip, which looks like a side saddle with two horns instead of one,—the pouch, into which there is an opening only between the horns, being almost concealed by the lamina, which hangs down in the manner of saddle-flaps. The column, which Mr. Dalzell does not mention, falls back, is small, short, semiterete, with a vertical rostellum pointing downwards, and dividing into a pair of broad scissor-like blades. Upon this lies a great oblong gland, to which is attached an obovate channeled membranous caudicula.

N.B. *Micropera viridiflora*, Dalzell, is *Saccolabium viridiflorum*, No. 217.

STEREOCHILUS, n. gen.

Acaulis. *Folia* lorata, apice obliqua. *Racemi* laterales, laxi, flexuosi, pauciflori (hirti). *Sepala* et *petala* subæqualia patentissima, lateralibus labello leviter adnatis. *Labellum* solidum, carnosum, sacciforme, facie superiore concava basi bicorni. *Columna* recta, teres, basi haud producta, rostello horizontali subulato. *Pollinia* 4, oblonga, omnino distincta, caudicula setacea, glandula minutissima.

This genus is near Camarotis, from which it differs in its solid bag-shaped lip with a pair of horns at the base, in its setaceous caudicula, and in the 4 oblong pollen-masses being perfectly distinct from each other.

226. S. hirtus.

Khasija, at 5000 feet, *J. D. H. & T. T.* (177).

Leaves narrow, rather more than 4 inches long by ⅝ths wide. Racemes 7–8-flowered. Flowers less than ½ an inch in diameter, free from the coarse short hairs that clothe the ovary and pedicels.

SCHŒNORCHIS, *Blume*.

227. S. juncifolia, *Blume*,

Seems to be the only species, if the genus is characterized by the two long erect filiform processes of the column. Otherwise there is nothing sufficient to distinguish the genus from Sacco-

labium, to which *Schœnorchis paniculata* and *S. micrantha* certainly belong.

SARCANTHUS, *Lindley*.

228. S. peninsularis, *Dalzell, in Hook. Journ.* iii. 343. (S. pauciflorus, *Wight, Ic.* 1747).

Western India, *Dalzell*; Malabar, on trees, *Jerdon* (*Wight*).

Specimens of this from Dalzell occur in Stocks's Herbarium now at Kew; and I also have it in a very young state from Dr. Wight, whose figure is by no means so good as usual. (Wight's three other Sarcanthi belong to Saccolabium.) Griffith's *Sarcanthus secundus*, Not. iii. 363, t. 336, from Suddyah in the Mishmee hills, seems to be this, which, if so, will no longer be merely a western plant.

229. S. pallidus, *Lindl. Bot. Reg.* 1840, *misc.* 185. (S. tricolor, *Rchb. f. in Bonplandia.*—Saccolabium racemiferum, *Lindl. Gen. & Sp. Orch.* 224, no. 24.)

Khasija, at 4000 feet, *J. D. H. & T. T.* (178), also found in Mr. Raban's garden, E. Nepal, *J. D. H.* (*id.*).

This differs in no respect whatever from the garden plant. Prof. Reichenbach's synonym is derived from a communication from that learned Orchidologist.

COTTONIA, *R. Wight, Ic.* no. 1755.

230. C. macrostachya, *Wight,* l. c. (Vanda peduncularis, *Lindl. Gen. & Sp.* p. 216.)

S. Concan, *Dalzell, in hb. Stocks.* (4).

231. C. Championi, *Lindl. in Hook. Journal,* vii. p. 35.

Khasija, at 3000–4000 feet, *J. D. H. & T. T.* (190).

This seems to be in no respect different from the plant found by Champion on Victoria Peak in Hong Kong, and thus affords another remarkable instance of epiphytal Orchids occurring in stations widely remote, without, as far as we at present know, any intervening locality.

UNCIFERA, gen. nov.

Caulescens. *Folia* disticha, subcarnosa. *Racemi* densi, oppositifolii. *Sepala* libera, erecta, obtuse carinata, æqualia. *Petala* paulo minora, retusa. *Labellum* infundibulare, in calcar retrorsum uncatum vacuum productum, membranaceum leviter trilobum, apice carnosum. *Columna* teres, decurva, apice dilatata, biauris, area stigmatica horizontali prona. *Anthera* apice membranacea, elongata, bidentata. *Caudicula* maxima, cartilaginea deorsum canaliculata supra medium dilatata, apice in falcem obtusam contracta cujus acies labellum respicit. *Pol-*

linia 4, arctissime geminata, æqualia, aciei falcis per ligulas 2 elasticas adnata. *Glandula* longissima, cartilaginea, sagittata.

232. U. OBTUSIFOLIA; foliis latis loratis obtusis oblique bilobis, petalis 3-veniis, labelli margine utrinque 1-dentato apice retrorsum bidentato, calcare apice inflato.

Base of Khasija, *J. D. H. & T. T.* (194).

Flowers twice as large as in the following.

233. U. ACUMINATA; foliis lanceolatis oblique acuminatis obtusis petalorum venis 3 cis apicem evanescentibus, labelli 3-lobi lobis lateralibus rotundatis intermedio brevi tereti carnoso obtuso, calcare acuminato.

Assam and Khasija, *Griffith*; base of Khasija, *J. D. H. & T. T.* (193).

Flowers much smaller than in the last. Spur of lip tapering to the point. Petals 3-veined, as in *U. obtusifolia*; but the veins stop short of the blunt end, instead of running out.

Of this very curious genus the two species exactly agree in their column and its parts, although so different in the details of the petals and lip. I know of no parallel to the terete column, bent down till the stigma is brought into a horizonal position, looking down as it were into the spur; or to the singular caudicle, which after expanding laterally from its narrow point, and bending down its sides so as to form an arch over the anther-bed, which is here the apparent back of the column, suddenly contracts into a process like a billhook, the edge of which faces the front and bears the pollen-masses. The abruptly hooked lip, which has suggested the name, is itself unlike anything among Indian Orchids.

ANGRÆCUM, *Thouars*.

The only Indian species that I have seen of this African genus is the following:—

234. A. ZEYLANICUM; subacaule, foliis lanceolato-loratis lobo altero apicis elongato subfalcato, racemis filiformibus paucifloris duplo longioribus, sepalis petalisque acuminatis æqualibus, labello cochleato acuminato calcare horizontali clavato.

Ceylon, at Narawelle, *Champion*.

Very like *A. caulescens*; but the leaves are broad, 10 inches long, with one of the terminal lobes much longer than the other, and the spur not inflated at the point. I have not seen the column in an examinable state.

AERIDES, *Loureiro*.

235. A. Wightianum, *Lindl. Gen. & Sp.* p. 238. (A. testaceum, *Id.*—Vanda parviflora, *Lindl. in Bot. Reg.* 1844, *misc.* 57.)

Ceylon, Tangalle, *Champion*; Concan, *Law, in hb. Hooker.* (183).

236. A. cylindricum, *Lindl.* l. c.; *Wight, Ic.* 1744; *Bot. Mag.* 4982. Nilgherries, *J. D. H.* (210); Sikkim, at 5000 feet, *Id.* (210).

237. A. tæniale, *Lindl.* l. c. (Aerides carnosum, *Griff. Not.* t. 338 A.) Bootan, *Griffith*; Khasija mountains, up to 3000 feet, *J. D. H. & T. T.* (191).

"Flowers pale lilac," *J. D. H.* In the Khasija specimens the leaves are from 4 to 5 inches long, and 1 to 1½ inch broad.

238. A. affine, *Wallich, Cat.* no. 7316; *Sertum Orch.* t. 15; *Bot. Mag.* t. 4049, bad. (A. roseum, *Loddiges*; *Paxton, Fl. Gard.* t. 60.—A. trigonum, *Klotzsch, fide Rchb. f.*)

Plains of E. Bengal and Assam, *J. D. H. & T. T.* (185); Assam and Bootan, *Griffith.*

Among the many specimens I have seen, flowers have occurred in drooping and upright racemes, deep crimson and pale rose, with the lip and other parts acute or obtuse, all which are therefore marks of one and the same variable species.

239. A. odoratum, *Loureiro.*

Base of Khasija, up to 2000 feet, *J. D. H. & T. T.* (182); Garden of Saharunpore, *Id.*; Sikkim, in low valleys, *J. D. H.*

240. A. crispum, *Lindl. Gen. & Sp. Orch.* p. 239; *Bot. Reg.* 1842, t. 55; *Bot. Mag.* t. 4427. (A. Brookei, *Bateman, in B. R.* 1841, *misc.* 116.—Saccolabium speciosum, *Wight, Ic.* t. 1674.)

Concan, *Law, in hb. Hooker.* (268); *Dalzell, in hb. Stocks.* (75).

Several varieties of this beautiful plant are in our gardens. The flowers in *A. Brookei* are rather smaller than usual.

241. A. Lindleyanum, *Wight, Ic.* t. 1677.

"On clefts of rocks bordering the Kartairy falls below Kaitie; also on rocky clefts on a high hill over Coonoor, flowering nearly the whole year," *R. Wight*; Nilgherries, *T. T.* (208).

One of the finest of its order, the flowers being larger than in either *A. crispum* or *falcatum*, and in larger more branching panicles. For this reason the localities given by Wight are stated exactly, in the hope that some collector may send it home. In front of the opening into the spur stands a pair of large curved tubercles, which have not been observed in *A. crispum.*

242. A. difforme, *Wallich, in Lindl. Gen. & Sp.* 242.

Khasija, at 3000–4000 feet, *J. D. H. & T. T.* (204), *Griffith.*

This, which is the plant that Wallich had before him, seems to differ from the following in having smaller flowers, with the middle lobe of the lip only 2-lobed, the basal ones longer and a little undulated, and the leaves more tapering to the base. This I learn in part from careful dissection, and in part from one of

Dr. Hooker's admirable sketches. The Sikkim plant may therefore be defined thus:—

243. A. HYSTRIX; foliis oblongis, petalis linearibus, labelli lobis lateralibus planis intermedio trilobo fimbriato apice recurvo brevioribus.
Sikkim, at 4000–5000 feet elevation, *J. D. H.* (204).

The flowers are yellow with crimson streaks along the sepals and petals; the middle lobe of the lip, which is deeply fringed and crimson, consists of two lateral lobes diverging at the base, and converging upwards over a circular recurved middle lobe.

244. A. decumbens, *Griff. Not.* iii. t. 320, a Burmese plant, seems to be a true Aerides; but I have seen no specimen.

VANDA, *R. Brown.*

To the species described in '*Folia orchidacea*,' the following fine addition to the section FIELDIA has to be added:—

245. V. UNDULATA; foliis distichis obtusis bilobis pedunculo apice paucifloro triplo brevioribus, sepalis petalisque recurvis membranaceis lineari-lanceolatis undulatis, labello breviore carnoso cochleato in laminam linearem acutam sub apice tuberculatam producto.
Sikkim, *Cathcart, Ic.*

The whole habit is that of *V. spathulata* and *cærulescens*. The flowers are fully two inches in diameter, with thin white sepals and petals tinged with pink, and a yellow fleshy lip fasciated internally with red lines. I have only seen a drawing prepared by Mr. Cathcart's artists.

TÆNIOPHYLLUM, *Blume.*

246. T. ALWISII; minutissimum, spica pauciflora erecta, bracteis carinatis triangulis, perianthii laciniis omnibus connatis acutis conformibus, calcare hemisphærico, polliniis pyriformibus in glandulam sessilibus.
On the branch of a Symplocos, Ceylon, *De Alwiz.*

The smallest Orchid I know, the flat roots not being more than 1½ inch long, and the stem, including flowers, ¼ inch. The whole plant is pale green, even the flowers having no other colour. Mr. Thwaites, who sent me a drawing of it (and I have seen nothing more), proposed to call it *Alwisia minuta*, after his excellent native draughtsman, who was the first to discover it; and if the figures in Blume and the Xenia represent the invariable characters of Tæniophyllum, this and *Dendrobium algosum* of Reinwardt's MSS. ought to be distinguished; but Prof. Reichenbach, jun., who has had the opportunity of examining Tæniophylla, assures me that this is one, and I possess no materials on which to form an opinion for myself.

CHILOSCHISTA, *Lindl. Gen. & Sp.* p. 219.

247. C. usneoides, *Id.*; *Wight, Ic.* 1741.
Sikkim, at 4000 feet, *J. D. H.* (192).

According to Cathcart's drawings, the caudicula is short and broad, with a large semicircular gland, not subulate with a minute gland, as represented by both Wallich's and Wight's artists. The plant seems to be constantly leafless.

ACERAS, *R. Br.*

248. A. angustifolia, *Lindl. Gen. & Sp. Orch.* p. 282.
Khasija, 5000–6000 feet, *J. D. H. & T. T.* (280); N.W. Himalaya, 5000–8000 feet, *T. T.*; Sikkim, in hot valleys, *J. D. H.*

Flowers green, in a very long slender spike.

HERMINIUM, *R. Br.*

249. H. monorchis, *Id.*
N.W. Himalaya, 8000–12,000 feet, *T. T.* (263); Nutra, W. Thibet, 11,000 feet, *Id.*

250. H. congestum, *Lindl. Gen. & Sp. Orch.* p. 305. (H. unalaschkense, *Rchb. f. Orch. Fl. Germ.* p. 107, t. 65, excluding the syn. of Platanthera Schischmareffiana.)
Sikkim, 11,000–12,000 feet, *J. D. H.* (265).

Differs from *H. monorchis* in its erect blunt obovate-lanceolate leaves and entire lip.

SATYRIUM, *Swartz.*

The first knowledge we had of the existence in India of this African genus was derived from the collections of Buchanan Hamilton, from which, in the year 1824, David Don published his *Satyrium nepalense.* In 1838 I became aware of the existence of two others, and described them under the names of *S. Wightianum* and *ciliatum.* Three years later Achille Richard described three others from the Nilgherry collections of Perrottet,—*Perrottetianum, albiflorum,* and *pallidum.* Authentic specimens of all these are before me, together with a considerable number from various parts of India, among which is a fine series from Drs. Hooker and Thomson. These materials show, not only that the genus Satyrium abounds in individuals, but that it is subject to very great differences of stature, foliage, and inflorescence. I think, however, the three species admitted in 1838 are to be distinctly recognized; but the Nilgherry plants of Achille Richard are not distinguishable from *S. nepalense,* not even his *S. pallidum,* said to have yellow flowers, which is probably a mistake.

The original *S. nepalense* is distinctly known by its somewhat lax inflorescence, large coloured bracts, and spurs as long as the ovary, or longer. The two others have very short spurs. Of these, *S. ciliatum* has a thin inflorescence like that of *S. nepalense* itself; *S. Wightianum* has a very dense inflorescence; both are much dwarfer than *S. nepalense*. The specimens under my examination may be arranged thus:—

251. S. Nepalense. *D. Don, Prodr. Fl. Nep.* 26; *Wight, Ic.* 929. (S. Perrottetianum, *Ach. Rich. Ann. Sc.* ser. 2. xv. 76; *Wight, Ic.* 1716. —S. albiflorum, *A. Rich.* l. c.; *Wight, Ic.* 1717. S. pallidum, *A. Rich.* l. c.).

Sikkim, 7000–12,000 feet, stout, like Gymnadenia, *J. D. H.* (259); Ceylon, *Macrae* (9); Nilgherries, *Wight, Perrottet* (193, *hb. Mus. Par.*); Mysore, *Stocks* (53); Khasija, *Griffith, Lobb*, 4000–6000 feet, *J. D. H. & T. T.* (259); N. W. Himalayas, *T. T.*

S. Perrottetianum is merely a gigantic state of the species, while *S. pallidum* is its starved form; not, however, the most so, for the old specimens sent from Nepal by Wallich among his earliest collections are still more attenuated.

252. S. Wightianum, *Lindl. Gen. & Sp. Orch.* p. 340; *Wight, Ic.* 1718. Nilgherries, *Perrottet* (191 & 850 *in hb. Mus. Par.*), *Wight*; Khasija, *Lobb*.

A much dwarfer plant than the preceding, with two broad radical leaves suddenly changing to about two great inflated herbaceous sheaths, and an extremely dense blunt spike. Flowers "rubri aut coccinei" according to Perrottet, pink according to Wight, and smaller than in *S. nepalense*.

253. S. ciliatum, *Lindl.* l. c.

Sikkim, 7000–12,000 feet, *J. D. H.* (259); Bootan, grassy sward above Tongsa, 10,000 feet, *Griffith*.

The very short spurs of this are so different from the long attenuated ones of *S. nepalense*, that I think it must be distinct. Moreover it is a smaller plant with 2–3 spreading herbaceous distant sheaths, but little inflated. In the original specimen the bracts are large and herbaceous, in those from Bootan much smaller and deflexed, the plant varying like *S. nepalense* in that respect.

DIPLOMERIS, *D. Don*.

254. D. pulchella, *Id.*

Khasija, *Griffith*, 2000–4000 feet, *J. D. H. & T. T.* (256).

Flowers pale straw-colour or nearly white, variable in size. Spur green.

POGONIA, *Jussieu.*

255. P. flabelliformis, *Lindl. Gen. & Sp. Orch.* 415.

Concan, *Law, in hb. Hooker.* (350); near Dharwar, *Stocks, in hb. Hooker.* (68); Mysore, *Id.* (54).

It is probable that Blume's *Rophostemon concolor* should be referred to this species.

256. P. carinata, *Lindl.* l. c.; *Wight, Ic.* t. 1720. (Pogonia 2, *Griffith, Notul.* iii. 377, *Ic.* 345.)

I have never seen this plant, which appears to be perfectly distinguished by its stout habit, very large tubers, and lip acute and shaggy within, instead of being nearly naked and rounded at the point. Griffith's Pogonia No. 2 is evidently the same; of his Pogonia No. 1, which seems to be near *P. Juliana*, but distinct, I have seen no specimen.

ERIA, *Lindley, in Bot. Reg.* 904.

This genus, like Dendrobium, consists of species extremely dissimilar in habit, and must now receive several supposed genera, created by different authors before the limits could be definitely settled. These are *Conchidium* and *Xiphosium* of Griffith, *Tylostylis*, *Mycaranthes*, *Cylindrolobus*, and *Trichotosia* of Blume, and my own *Bryobium* and *Trichosma*. But although no longer admissible as genera, the species collected under these names are for the most part convenient sections.

The careful study of a very large quantity of materials leads me to propose the following classification. In the first place, the species of Griffith's CONCHIDIUM, analogous to the small Stachyobia in Dendrobium, are readily known by their thin leaves, almost stemless habit, and smooth flowers; such stem as they form is merely a depressed pseudobulb covered by the bases of the leaves. Then follow the species with true fleshy pseudobulbs and nothing more, separable into large-flowered woolly species (DENDROLIRIUM), large-flowered naked species (XIPHOSIUM), large-flowered woolly species with an unguiculate flat roundish lip (TYLOSTYLIS), and small-flowered woolly species (MYCARANTHES), in which the fleshy pseudobulb is sometimes exchanged for a slender cylindrical stem like that of Trichosma. Next to these stands TRICHOSMA itself, with its long slender 2-leaved stems, large smooth flowers, and fleshy anther. Another group, HYMENERIA, includes the species with thin sepals and petals, which are usually naked, and short fleshy stems having a few leaves towards the top. The remainder are truly caulescent; among these, four well-marked

subdivisions may be formed: viz. ERIURA, remarkable for a tuft or two of wool on the axis of the lip, TRICHOTOSIA with coarse shaggy racemes, CYLINDROLOBUS, with 1- or 2-flowered peduncles clothed with smooth coloured membranous bracts below the flowers, and finally UROSTACHYA, which includes the species that will go into none of the preceding sections.

§ I. CONCHIDIUM, *Griffith.*

This group bears the closest analogy to the second section of Stachyobium among Dendrobia, like it, consisting of small stemless species, with round or depressed pseudo-bulbs, membranous leaves, and flowers solitary or in few-flowered racemes, for the most part very minute. To this last, however, *E. braccata* and *Lichenora* are exceptions. In *E. pusilla, microchilos,* and others, four of the pollen-masses are rudimentary and easily overlooked: in *muscicola* and *microchilos*, indeed, I have only succeeded in finding four; but their form, tapering downwards into a point, seems to be a safe mark to separate them from the minute Dendrobia.

257. E. braccata. (Dendrobium braccatum, *L. O.* p. 75.—Eria reticosa, *Wight, Ic.* 1637.—Eria uniflora, *Dalzell in Hooker's Journal,* iv. 111.) Ceylon, *Macrae, Gardner* (859), *Thwaites* (2356); Horton plains, *Champion* (Eria velifera, *R. W.*); Nilgherries, *Wight*; common on trees in the Western Ghauts, in the rainy season, *Stocks* (24).

When this was first published I had been unable to examine the pollen-masses. It varies in the size of the flowers; those from the Western Ghauts, preserved among Stocks's plants, are four times as large as the Cingalese, with much more acuminate sepals and petals.

258. E. Lichenora. (Lichenora Jerdoniana, *Wight, Ic.* 1738.)
Malabar mountains, *Wight.*

This remarkable plant is certainly not different from Eria.

259. E. nana, *Ach. Rich. in Ann. Sc. Nat.* ser. ii. xv. 19.
Nilgherries, *A. Richard, Wight* (171, 172).

My authentic specimens from A. Richard are identical with Wight's 171. His 172 is somewhat different, with flowers as large as those in Richard's very bad figure of his *Dendrobium microbolbon*, which looks as if it had been made up from the leaves and flowers of *E. nana*, while the dissections belonged to another plant. The thin broad obovate leaves of this have, however, no resemblance to Richard's figure.

260. E. MUSCICOLA; foliis binis lanceolatis basi angustatis scapo apice bifloro æqualibus, bracteis cucullatis membranaceis cuspide herbaceo flore breviore, sepalis petalisque lineari-lanceolatis æqualibus ascendentibus, labello lanceolato canaliculato dorso pubescente.

Dendrobium muscicola, *Lindl. Gen. & Sp.* 75.

Ceylon, *Champion, Gardner* (853).

I can only find 4 pyriform pollen-masses in the single flower at my disposal. The whole plant not more than 2 inches high. Flowers resemble those of *Eria nana* on a very small scale. Since it has never been found among collections from the N. of India, it is probable that the old locality "Nepal," was erroneous.

261. E. microchilos. (Dendrobium microchilos, *Dalzell, in Hooker's Journ.* iii. 345.)

On Mango trees in Western Bengal, *Dalzell, Stocks* (28).

I have this as *D. fimbriatum* of Dalzell, out of Stocks's herbarium; it is certainly distinct from that plant, although very much like it. The flowers are smaller, more fleshy; and the lip is slightly unguiculate, then irregularly widened and thick-edged, after which it contracts into a thin-edged acute apex. Only two pairs of pollen-masses could be found in the flowers I dissected. The tubercles at the base of the lip, spoken of by Mr. Dalzell, I have not succeeded in finding.

262. E. Dalzelli. (Dendrobium Dalzelli, *Hooker, Journ. Bot.* iv. 292. Dendr. fimbriatum, *Dalzell,* l. c.—Dendr. filiforme, *Wight, Ic.* 1642.)

Western Ghauts, on trees, *Dalzell*; hollow trees in the ruins, *Stocks* (27); Concan, *Law* (*hb. Hooker*. 166, 91); Bombay Presidency, *Dalzell* (*hb. Hooker*. 167).

I am not surprised at Mr. Dalzell's having taken this for *E. microchilos*, as he tells us was the case; for the two are exceedingly similar, as is indeed shown by so accurate an observer as Stocks having given the name of *microchilos* to specimens now before me. The flowers are, however, rather larger and less fleshy; the lip is membranous, ovate-lanceolate, and distinctly serrulate towards the point. As to the marginal glands of the sepals, which gave rise to the name *fimbriatum*, they are very evanescent, and I suspect sometimes altogether absent. They are hardly discoverable in Mr. Law's Concan specimens. Imperfect specimens from Ceylon (2353 Hb. Hooker.) probably belong here. Of the eight pollen-masses, four are quite rudimentary.

263. E. ARTICULATA; pseudobulbis oblongis in catenam speciosam articulatis, foliis ......, scapo setaceo flexuoso 5-7-floro, bracteis ovatis cucullatis, petalis acutis multo brevioribus.

Ceylon, *Mrs. General Walker* (*hb. Hooker.*); *Gardner.*

Of this singular plant I have a fragment from Gardner, and several are preserved in the Hookerian herbarium, but all without leaves. The pseudobulbs are oblong shrivelled bodies, jointed into a sort of chain or necklace. The flowers are very small and with no elongation of the sepals. Neither lip nor pollen-masses are known to me.

264. E. pusilla. (Conchidium pusillum, *Griffith, Not.* 321. t. cccx.—Phreatia uniflora, *Wight, Ic.* t. 1734.).

Khasija, *Griffith*; Churra Punjee, *Id.* (666).

This, the original Conchidium, has not eight equal pollen-masses, as is represented in the figure of Wight's artist, but they are even more unequal in size than is shown in Griffith's plate. It is not in the Khasija collections formed by Hooker and Thomson.

265. E. sinica. (Conchidium sinicum, *Lindl. in Hooker's Journ.*)

Hong Kong, *Champion* (278).

Differs from the last in the sepals and petals not being acuminate, in the lip being serrated; the scape is both 1-flowered and 2-flowered. I fear, not distinct from the Khasija species.

§ II. DENDROLIRIUM, *Blume.*

If we collect into one group all the large-flowered woolly species with pseudobulbs only, an assemblage will be formed both natural and obvious, to which Blume's happy name of Dendrolirium may be applied. Some terete-leaved plants can hardly indeed be said to form pseudobulbs; but their leaves fall eventually from the summit of very short stems altogether analogous to pseudobulbs, although unlike in form. Two divisions are effected by taking into account the form of the leaves.

A. *Leaves flat and broad.*

266. E. ornata, *Lindl. Gen. & Sp.* p. 66. (E. armeniaca, *Id. Bot. Reg.* 1841, t. 42.)

Moulmein, *Griffith*; Khasija, at 2000 feet, *J. D. H.* (66); Java, *T. Lobb* (219); Philippines, *Cuming.*

267. E. AERIDOSTACHYA (*Rchb. f. in litt.*); folio lanceolato-oblongo coriaceo, racemo cylindraceo multifloro ferrugineo-tomentoso, bracteis minutis, mento elongato obtuso rectiusculo, labello lanceolato acuto nudo medio involuto basi concavo.

Batavia, *Loddiges, in hort.*

I learn from Prof. Reichenbach that this is among Zollinger's unpublished Java plants. It resembles what I suppose to be the *Dendrolirium sulcatum* of Blume, but is very much more densely tomentose.

268. E. flava, *Lindl. in Wall. Cat.* 1973.

Sikkim, hot valleys, 1000-2000 feet, *J. D. H.* (63).

β. RUBIDA; floribus minoribus, petalis virescentibus, labelli lobis lateralibus rotundatis.

Sikkim, *Cathcart*.

The type of this plant is the *Dendrobium pubescens* of Sir W. Hooker, well figured and described in the 'Exotic Flora,' t. 124. It is important to observe this, if we are to determine to which of the other nearly-allied woolly species the name belongs. In that plant the lip has scarcely any hairs on the inner surface, and the lateral lobes are extremely short, which is the case with the plants above quoted. The variety β is only known from a native figure; and the account given of it must be judged of accordingly. It looks different, especially as the pollen-masses seem to be long and tapering, not roundish, and plano-convex.

269. E. ELONGATA; pseudobulbis ovalibus, foliis lato-lanceolatis coriaceis acuminatis basi angustatis, racemo niveo lanato elongato distantifloro, bracteis ovatis acutis lævibus dorso lanatis, petalis ovalibus subtrinerviis, labelli lobis lateralibus scabro-tomentosis intermedio subcuneato multo brevioribus rotundatis, clinandrio alte marginato.—(E. flava, *Griffith, Not.* iii. 301.)

Burma; Moulmein, on trees in damp woods, *Griffith* (346); in woods at Zimjaik, *Id.* (347); Moulmein, *T. Lobb.*

As in *E. flava*, the clinandrium is surrounded by a membrane, which in this species is remarkably deep; the lip has rounded lobes, clothed inside with coarse, scattered felt, and the middle lobe has two obscure raised lines as well as a distinct middle line. That it is perfectly distinct from the last is certain; but it varies in the form of its lip, the 346 of Griffith having the lateral lobes rather acute and falcate instead of rounded, and the middle lobe larger, with a more distinct superficial lamella in the middle.

270. E. lanata, *Griffith, Not.* iii. 301.

Mergui, *Griffith* (810).

So much is this in habit like the Sikkim *Eria flava*, that it may be easily mistaken for it; but its petals are linear lanceolate-acuminate, and the long narrow lip has a quadrate cuspidate middle lobe, a long isthmus, and a narrowly wedge-shaped hypochilium with small rounded lobes and three distinct elevated distant ribs. The pseudobulbs are ovate, not oval.

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B. *Leaves terete or very narrow.*

271. E. pannea, *Lindl. Bot. Reg.* 1842, *misc.* 79. (E. teretifolia, *Griff. Not.* iii. 298, t. 300. fig. 2; *Itinerary,* 202, no. 1185.)

Bootan, at 3600 feet, on Gordonia, *Griffith*; Khasija, at 2000 feet, and Sikkim, on rocks in hot valleys, *J. D. H.* (62); *T. Lobb.*

A long creeping slender rhizome bears, at intervals of 2 to 4 inches, very short woolly stems, each furnished with from one to four terete fleshy leaves, varying in length from 1 to 6 inches and more, the longest belonging to the Khasija plant. Griffith's figure is thus far bad, that I do not find in his own specimens the lip anything like so wavy as he represents it. I have a very similar plant collected in Borneo? by T. Lobb, with very short one-leaved pseudobulbs that touch each other, and leaves more linear; but my solitary flower does not bear examination.

272. E. SICARIA; pseudobulbis oblongis 1–2-phyllis, foliis linearibus carnosis acutissimis semiteretibus, racemis lanatis lateralibus multifloris folio multo brevioribus, bracteis ovatis patentibus intus glabris, floribus albo lanatis, labello .... apice convexo apiculato.

Mergui; Tharapown, in woods, *Griffith.*

"*Folia* carnosa, linearia. *Sepala* extus albovelutina, intus cum petalis viridescentia, lateralia maxima purpureo lineata et notata. *Labellum* albofuscum, intus brunneum disco calloso." *Griffith, MSS.*

Very like a narrow-leaved *Eria flava.* Leaves about 6 inches long, resembling slender stilettos, but tapering at the base into a furrowed petiole. My flowers give no more information.

§ III. Xiphosium, *Griff.*

Although this supposed genus is undoubtedly an Eria, it may form a section sufficiently distinguished by its large smooth flowers and distinctly-formed pseudo-bulbs. It only differs from Dendroliria in the flowers not being woolly.

273. E. rosea, *Lindl. in Bot. Reg.* t. 978.

Hong Kong, *Champion* (275).

This certainly differs from the next, with which I formerly confounded it, in its broad blunt lip with the lower half much wider than the upper.

274. E. carinata, *Gibson, in Calc. Journ. Nat. Hist.* v. 365. (Xiphosium acuminatum, *Griffith,* l. c. c. *ic.*; *Itin. Not.* 78, no. 1153; *Notul.* iii. 332, t. 316.—E. rosea, *Wall. Cat.* 7409.)

Khasija, *Griffith*; Sylhet, *Wallich.*

Differs from the last in having the sepals, petals, and lip acuminate, the middle lobe of the latter being as wide as the hypochil,

which has two continuous, not interrupted, rugose elevated lines. Not among the collections of Hooker and Thomson.

275. E. SCABRILINGUIS; pseudobulbis ovatis sulcatis, foliis binis oblongo-lanceolatis trinerviis, racemo oblongo erecto densifloro, labelli trilobi aspero-cristati lobis lateralibus brevibus acutis intermedio rotundato.

Sikkim, *ic. Cathcart.*

Flowers pale green. Lip deep violet. I have seen no specimen of either this or the next.

276. E. VITTATA; pseudobulbis oblongis, foliis binis oblongo-lanceolatis 5-nerviis, racemo oblongo elongato pendulo densifloro, labello oblongo costis 3 elevatis marginibusque crispis.

Sikkim, *ic. Cathcart.*

Flowers larger than in the last, pale green with crimson stripes; lip the same colour, but paler.

§ IV. TYLOSTYLIS, *Blume, Fl. Jav.* p. vi. (Callostylis, *Id. Bijdr.* 340.)

The long slender curved column and unguiculate roundish undivided lip of these plants make it convenient to place them in a section by themselves, especially considering their peculiar inflorescence, consisting of flat round woolly horizontal bracts.

277. E. pulchella, *Lindl. in Wall. Cat.* no. 7407; *Bot. Reg.* 1841. *misc.* 106.

Malacca, *Cuming.*

This is possibly the *Callostylis rigida* of Blume's Tabellen, 74; but if so, the figure is a bad one.

278. E. DISCOLOR; pseudobulbo in caulem subarticulatum extenso, labello oblongo subcordato acuto glabro concolore.

Sikkim; Glen Cathcart, 3000–4000 feet, *J. D. H.* (168).

I have seen no flower of this, and therefore trust to one of Mr. Cathcart's drawings, and a solitary specimen of the stem and leaves. It is much like the last; but the lip appears to be longer than broad, as well as whole-coloured and smooth, while in *E. pulchella* it is broader than long, yellow, with a small purple disk, and conspicuously tomentose.

§ V. MYCARANTHES, *Blume.*

The only species figured by Blume, *M. latifolia*, is an Eriura. Whether his *M. obliterata* and *lobata* belong to the same section is uncertain, nothing being known about them. With me, the

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species are only the following, easily known by their dense spikes of small woolly flowers, the lateral sepals of which have scarcely any obliquity.

279. E. stricta, *Lindl. Coll. Bot.* t. 41 B. (E. secundiflora, *W. Griff. Not.* iii. 302. t. 301.—Mycaranthes stricta, *Lo.* 63; *Wight, Ic.* 1733.)
On the Naga hills, on a species of Gordonia at the elevation of 3500 feet, *W. Griffith*; Darjeeling, *Id.*; Malacca, *Id.* fide cl. *Wight*; Sikkim, at 3000 feet, and Khasija, at 4000 feet, *J. D. H.* (59).

280. E. retusa, *Rchb. f. in Bonplandia, March* 1, 1857. (Phreatia retusa, *Lindl. Orch.* p. 64.—Dendrolirium retusum, *Blume, Bijdr.* 351. —Bryobium pubescens, *Lindl. in Bot. Reg.* 1838, *misc.* no. 145.)
Java, *Zollinger.*

The extrication of this synonymy is due to Prof. Rchb. fil.

281. E. MERGUENSIS; caulibus cæspitosis carnosis clavatis, foliis papyraceis oblongis basi angustatis apice obliquis uncipulatis, spicis lateralibus elongatis griseo-tomentosis pedunculo evaginulato, floribus (minimis) pilosis, labello trilobo infra isthmum transverse lamellato.
Mergui, *Griffith* (1034); Moulmein, *Lobb.*

Something like a small specimen of *E. stricta*; but the stems are fleshy and clavate, the flowers much smaller and not secund, and the lip quite different.

§ VI. TRICHOSMA, *Lindl. in Bot. Reg.* 1842, t. 21.

Now that the limits of the genus Eria begin to be understood, I must admit that Prof. Reichenbach is right in reducing to its ranks my genus Trichosma, notwithstanding its very peculiar habit. It will now, therefore, stand as a section, distinguished by its great fleshy anther and long slender 2-leaved stems, resembling those of a gigantic Pleurothallis.

282. E. suavis. (Trichosma suavis, *Lindl.* l. c.—Eria cylindripoda, *Griff. Notul.* iii. 299.)
Khasija, *Griffith* (1013, 1258); *J. D. H. & T. T.* (144); Sikkim at 5000-6000 feet, *J. D. H.* (144).

§ VII. HYMENERIA.

This name is proposed for all those species which, to a fleshy somewhat shapeless stem with a few thin leaves, add a many-flowered inflorescence that is smooth or nearly so. Possibly it might be subdivided into those with a dense inflorescence like *E. convallarioides* and *pumila*, and such as have the thin racemes of *E. bractescens.*

283. E. convallarioides, *Lindl. Gen. & Sp. Orch.* p. 70; *Bot. Reg.* 1841. t. 62, 1847, t. 63.

Khasija, *Griffith*; at 4000–6000 feet, *J. D. H.* (60); Sikkim, at 5000 feet, *Id.*, valleys 3000–4000 feet, *Id.*

Varies in the colour of the flowers, and in their size.

284. E. excavata, *Lindl. Gen. & Sp.* p. 67.

This differs from *E. alba* chiefly in having the middle lobe of the lip cordate, acute, ribbed, and much smaller than the middle lobes which are broad, falcate, and acute.

285. E. alba, *Lindl.* l. c. p. 67.

a. Lip white.

Sikkim; Darjeeling, in valleys at 3000–4000 feet, *J. D. H.* (142).

β. Lip yellow.

Sikkim, 4000–5000 feet, *J. D. H.* (68); Mussooree, *Edgeworth.*

In *β* the lateral lobes of the lip are shorter and blunter than in *a*, and the leaves are thinner and more acuminate.

286. E. LINEATA; foliis oblongis subcoriaceis acutis, racemis multifloris, bracteis ovalibus membranaceis reflexis, ovario tomentoso, sepalis ovatis subsecundis, labelli lobo medio subrotundo retuso plano lateralibus obtusis minoribus, axi lineis 3 crassis elevatis ad isthmum evanescentibus.

Java, *hort.* (*Veitch*); Continent of India, *hort.*

This is very like *E. alba a*, and may be a variety; but the flowers are dirty yellow with distinct purple stripes, not white, and are much smaller, the leaves are twice as broad and more coriaceous, and the dull purple blunt lateral lobes of the lip are not wider than the yellow almost 3-toothed middle lobe. It is a garden plant of doubtful origin.

287. E. obesa, *Lindl. Gen. & Sp.* p. 68. (Eria Lindleyana, *Griff. Not.* iii. 300.)

Moulmein and Mergui, *Griffith.*

I have no doubt about the correctness of this identification, notwithstanding that in Griffith's Notulæ it is said to be 554 of his Mergui herbarium, for I have from himself a drawing, made in Moulmein in February 1834, and a specimen from Mergui numbered 374, which agree with his description. Neither Wallich's bad old specimens, nor that from Griffith, have any leaves. He states them to be "lanceolata v. ovato-lanceolata integerrima glabra venosa apice recta v. torta." By a typographical error in the Botanical Register, the stems are said to be 27 instead of 2¼ inches long. There is a variety with larger flowers and the lower half of the lip very gradually passing into the upper, formerly

named by me *E. trilophota*, which has been found in Moulmein by Lobb as well as by Griffith (no. 370), and is now in cultivation as a Java and even Borneo species, but probably without foundation. The flowers are pure white with a lemon-coloured lip, marked by three longitudinal purple elevated lines.

288. E. affinis, *Griff. Not.* iii. 297.
Burma, *Griffith* (1074).

This is remarkable for a very long narrow cuneate lip, with two small acute teeth (or lobes) at the base of a roundish ovate acute terminal lobe; it has also two converging principal veins slightly raised above the surface into a thin narrow edge, interrupted in the middle. The mentum is long, narrow, and obscurely 2-lobed.

289. E. pulchella, *Griff. Not.* iii. 297.
Mergui (1055), and on trees in Moulmein (345), *Griffith*.

Resembles *E. bractescens*; but the stems are 3 or 4 inches long and cylindrical, the flowers are yellow, and the lip has three continuous elevated lines, of which the two lateral are shorter and clavate.

290. E. pubescens, *Wight. Ic.* t. 1634.
Khasija, *Lobb*.

The lateral veins of the lip rise into short vertical plates near both the points and the base.

291. E. MYSORENSIS; foliis oblongo-lanceolatis conduplicatis nervosis racemis paulo longioribus, ovario pubescente, bracteis ovalibus acutis reflexis glabris, sepalis petalisque acuminatis, labello unguiculato subcordato oblongo acuto juxta basin dilatatam pandurato omnino lævi.
Mysore, *Law*. (Cœlogyne, *Hb. Stocks*. 70.)

292. E. GRAMINIFOLIA; caule elongato vaginis membranaceis laxe vaginato, foliis lineari-lanceolatis gramineis nervosis, racemis tomentosis multo brevioribus, bracteis ovatis reflexis glabris, sepalis ovatis acutis mento brevi, petalis linearibus, labello hastato lobis lateralibus truncatis brevioribus intermedio subrotundo acuto, lamellis 2 oblique transversis bidentatis infra isthmum, ungue lato canaliculato.
Darjeeling, *Griffith*.

293. E. SPHÆROCHILA; caulibus brevibus imbricatis ovatis, foliis latolanceolatis membranaceis undulatis racemis tomentosis longioribus, bracteis linearibus acutis erectis, sepalis tomentosis ovatis subæqualibus acutis, petalis conformibus, labelli sessilis lobo intermedio subrepando rotundato venis varicosis lateralibus auriculiformibus.
Khasija, 4000–6000 feet, *J. D. H.* (68).

Like *E. alba* in general appearance, but wholly different in the details of its flowers.

There is also, under the number 68 in Hooker and Thomson's Herbarium, a plant from Gurwhal and Khasija, which is quite different from this, and which may be my *E. acervata*, notwithstanding some discrepancies.

294. E. Dillwynii, *Bot. Mag.* t. 4163, is certainly *E. bractescens* in a state of great vigour.

295. E. ringens, *Rchb. f. in Bonplandia*, is *E. ovata*, Bot. Reg. 1844, sub t. 29.

§ VIII. Eriura.

Under this name may be collected the species having small flowers more or less woolly, very large lateral sepals, and a lip flat at the base, furfuraceous in the axis, with a woolly tubercle at the apex and base, or at least at the apex. *E. javensis, abbreviata,* and *Sonkaris*, Rchb. f., together with the following, are all at present known with certainty.

296. E. paniculata, *Lindl. in Wall. Pl. as Rar.* i. 32. t. 36.
Sikkim, 10,000 feet, *J. D. H.* (67); rocks near Sarapanee, *Griffith* (1152).

297. E. obliqua. (Mycaranthes obliqua, *Lindl. in Bot. Reg.* 1840, misc. 184.)
Singapore, *Cuming, in hort.*

This differs from *E. bifalcis* in the form of the lip and in the presence of a large tumour at the base of the furfuraceous axis.

298. E. monostachya; foliis longissimis coriaceis gramineis canaliculatis, racemis longis cylindraceis tomentosis, labelli quadrilobi laciniis triangularibus acutis apicalibus minoribus, lamellis 2 triangularibus aristatis infra isthmum, tuberculis axeos 3 quorum tertium ultra apicem protrusum.
Mount Gembolo, in the east of Java, *Zollinger* (53).

I have this from Prof. Rchb. as *Eria paniculata*, from which it differs in its long cylindrical racemes, and the presence of two sharp-pointed triangular plates below the lateral incisions of the lip, as well as in the other characters above described.

299. E. Reinwardtii; foliis distichis linearibus rigidis apice obliquis acutis, racemo solitario tenui sessili multifloro, labelli quadrilobi basi et apice tuberculati laciniis lateralibus obtusis planis terminalibus subcrispis minoribus.
Java, *hb. Reinwardt.* (*Cymbidium parviflorum*).

Leaves 5 or 6 inches long, somewhat distichous. Spike 4 inches long, terminal, sessile, with small reflexed bracts nearly as long as the ovary.

300. E. BIFALCIS; foliis linearibus coriaceis obtusis apice valde obliquis, spica araneosa dissitiflora simplici terminali, floribus albo-tomentosis, labello cuneato 3-lobo laciniis lateralibus falcatis intermedia oblata tridentata, tuberculo apicis maximo inflexo baseos obsoleto.
Borneo, *T. Lobb.*

In habit much like *E. Reinwardtii*, but not more than 5 or 6 inches high. Flowers the size of *E. obliqua.*

301. E. SCLEROPHYLLA; foliis patentibus duris lanceolatis distichis apice acutissimis obliquis, racemis pluribus elongatis terminalibus albo-tomentosis, labelli cuneati lobis lateralibus acutissimis intermedio a lata basi lineari apice dilatato cuspidato, tuberculo apicis maximo baseos erecto foveato, lamella lineari a quoque isthmo decurrente apice libera.
Java, *Junghuhn* (279).

Much like *E. paniculata*; but the leaves are shorter, broader, and more spreading, and the lip wholly different. No. 300 of Junghuhn seems to be the same, but is only in fruit.

Mycaranthes latifolia, Blume, may also belong to this section.

§ IX. TRICHOTOSIA, *Blume.*

This supposed genus differs in nothing whatever from Eria. It may only stand as a section, with a caulescent habit and flowers covered with coarse ferruginous hairs. The surface and degree of division of the lip offer no available mark of recognition. All the species are conspicuous for the long brown hair that clothes the stem and leaves.

302. E. biflora. (Trichotosia biflora, *Griffith, Not.* iii. 331. t. 315.)
Malacca; on rocks and trees, Goondong Toondook, Mount Ophir, *Griffith.*

Near *E. annulata*, Bl., from which its excessively shaggy lip distinguishes it, as well as the want of the long glabrous recurved bracts of that species.

303. E. PULVINATA; villosissima, caulibus brevibus ascendentibus, foliis ovatis, pedunculis unifloris, sepalis hirsutis in cornu obtusum basi productis ovario æquale, petalis linearibus sepalo dorsali æqualibus, labello obovato emarginato intus piloso infra apicem pulvinato.
Mergui, *Griffith*, no. 2, Aug. 17, 1834.

I only know this from a drawing by Griffith, who represents it as having whitish solitary flowers, with an obcordate-spathulate lip, hairy and speckled with red inside, and a tuft of longer hairs below the apex. The clinandrium is also shown to be 4-lobed. It is probably the same as one of T. Lobb's plants distributed as coming from Borneo, but I suspect from Moulmein, of which

I have an imperfect specimen. In that plant the petals are acute, spathulate, and bordered with brown near the points, and the leaves are linear lanceolate, and much less hairy.

304. E. LEIOPHYLLA; caule ferrugineo tomentoso apice glabro diphyllo vaginis 2 membranaceis oppositis in medio, foliis oblongo-lanceolatis glabris, spica brevissima uniflora (?) arcte tomentosa, bracteis truncatis, labello rhombeo carnoso glabro obtuso basi convexo.

Borneo; on trees, Sarawak, at the height of 2700 feet, *T. Lobb.*

My specimen is nearly glabrous except the inflorescence. The stem is terete, 2-leaved, with a long brown sheath at the base, and a pair of smaller opposite membranous ones in the middle. The lip seems to be deep crimson.

305. E. annulata, *Bl. Mus. Lugd.* ii. 184.

A unique specimen from Sikkim comes near this species; but the flowers are very old. The leaves are broad and hairy, and filled with large masses of calcareous concretions.

306. E. ferruginea, *Lindl. in Bot. Reg.* 1839, t. 35.

E. Bengal; Jyntea mountains, at the height of 4000 feet, *J. D. H.* (65); Khasija, *Griffith.*

307. E. VULPINA (*Rchb. f.*); molliter ferrugineo-villosa, foliis oblongo-lanceolatis papyraceis obsolete nervosis, spica multiflora recta lanata, bracteis ovatis recurvis, floribus distantibus mento rotundato, petalis linearibus brevioribus ciliatis, labello carnoso glabro laciniis lateralibus dentiformibus intermedia rotundata.

Philippines, *Cuming.*

This is the plant hastily referred to in the Botanical Register (1845, t. 2) under *E. vestita*; but a more careful examination shows it to be quite distinct in its straight, not flexuose rachis, ovate not acuminate bracts, round, not elongated chin, short ciliated, not long smooth petals, and in the whole superficies of the lip, which appears to want the hairs and lamellæ of *E. vestita.* I have not been able to observe the tubercle seen at the base of the limb by my learned friend *Rchb. f.*; but the lip is so fleshy and compressed when dry, that I may have missed it.

308. E. CAPITELLATA; caulibus ad insertionem foliorum juniorum ferrugineo-hirtis, foliis carnosis anguste lanceolatis acuminatis glabriusculis, spicis brevibus densifloris, sepalis lateralibus ovatis, labello concavo carnoso ovato apice decurvo sub lente tomentoso infra apicem convexo.

Java, *T. Lobb* (253).

Until I received a specimen of the real *E. annulata*, I mistook

this for it. There are, however, these differences: the leaves are twice as broad and much less acuminate; the spikes are so dense as to be almost ovate; the lateral sepals are not acuminate; the lip is more rounded at the point and without the raised median line, instead of which there is only a slight convexity above with a corresponding concavity below. The *linea verruculosa*, ascribed by Blume to his *E. annulata*, does not exist in Zollinger's no. 15 of his second collection, which I take for that species; but there is a distinct elevated even midrib, with a slightly raised line on either side.

§ X. CYLINDROLOBUS, *Blume, Fl. Jav. præf.* vi. (Ceratium, *Id. Bijdr.* 341.)

There is nothing in the structure of the plants of this section, as far as I am acquainted with them, that corresponds with the character proposed by Prof. Blume in his *Mus. Lugd. Bat.* ii. 182. Undoubtedly a protuberance at the foot of the column does sometimes occur, but it affords no sectional mark; for if it exists in *E. nutans*, it is not to be found in *E. Khasiana*, which is only distinguishable upon careful examination; and it is a mere rudiment in *E. bicolor*, another very closely allied species. The siliquose fruit is of as little importance. I think, however, that the section may be conveniently adopted for all the caulescent species whose flowers, whether lateral or terminal, are solitary or in pairs, and arise from among empty coloured bracts. Such is the principle upon which the following have been collected.

A. *Flowers terminal.*

309. E. TRUNCATA; foliis 3 lanceolatis terminalibus apice subæqualibus, floribus geminis ovario tomentoso, sepalis oblongis obtusis, petalis subæqualibus antrorsum arcuatis, labello carnoso truncato linea media tenui elevata infra apicem triplici.

Moulmein, on Shoung-gyen at the height of 5000 feet, *T. Lobb.*

"Flowers white." The lip has two small ovate lateral lobes; but the middle lobe is obsolete, appearing only in the form of a broad line lying between the side lobes.

310. E. pauciflora, *Wight. Ic.* t. 1636.

Khasija hills, *T. Lobb*; Nilgherries, *Wight.*

Wight's figure of this is unusually good. The withered reflexed sheath at the base of the last joint of the stem seems to be characteristic of the species.

311. E. bicolor. (Dendrobium bicolor, *Lindl. Gen. & Sp.* p. 90.)

Ceylon, *Thwaites* (2761).

I have been favoured by Mr. Thwaites with a sketch of this, showing it to be a true Eria. The pollen-masses were previously unknown to me. A re-examination of the old fragments in my herbarium has shown the lip to be much like that of *Eria pauciflora*, as represented in Wight's plate, but with a shorter middle lobe. There is a small orange-coloured process at the base of the column. The surface of the middle lobe of the lip is rather pulverulent.

312. E. nutans. *Lindl. Bot. Reg.* 1840, *misc.* 196.
Singapore, *Cuming in hort. Loddiges.*

In this plant there is a large tubercle on the foot of the column, which is very short.

313. E. KHASIANA; foliis binis (?) lanceolatis acutis, floribus geminis glabris, sepalis petalisque subæqualibus, labello obovato laciniis lateralibus membranaceis obtusis subfalcatis incurvis intermedia oblata carnosa lamella tomentosa in medio lineisque 2 truncatis secus axin pulverulentum, columnæ pede omnino nudo.
Khasija, *Griffith.*

Much like *E. nutans* and *pauciflora*, but entirely different in the form of the lip.

B. *Flowers lateral.*

314. E. clavicaulis, *Lindl. in Bot. Reg.* 1840, *misc.* 219.
Khasija, at 4000–5000 feet, *J. D. H. & T. T.* (9).

The specimens in hb. Hooker. are not in flower, so that some uncertainty attends this species. It approaches the last section in having the leaves at the end only of the stem; and the flowers are almost terminal.

315. E. mucronata, *Lindl. in Bot. Reg.* 1842, *misc.* 27.
Philippines, *Cuming.*

Blume's *E. elongata* seems to be near this; but in my plant the little tuft of hairs at the base of the lip cannot be called "tuberculum dilatatum dense glanduloso-fimbriatum." Among De Vriese's Sumatra drawings is a "Dendrobium macranthum," with large solitary white flowers, very short lower sepals, and violet spreading bracts, which may be this *Eria elongata*. What appears to be the same plant exists in the Hookerian herbarium, collected in Tobie Island by Barclay.

316. E. brachystachya, *Rchb. f. in Bonplandia.*
Philippines, *Cuming.*

In this, which is perhaps a variety of the last, there is a small truncated tubercle on the foot of the column.

317. E. VALIDA; foliis oblongo-lanceolatis coriaceis apice valde obliquis obtusis, pedunculis bifloris bracteis ovatis erectis papyraceis cucullatis, floribus glabris, sepalis lateralibus ovatis dorsali petalisque 3-nerviis oblongo-linearibus, labelli lobo intermedio oblongo rotundato margine papilloso lateralibus duplo brevioribus acutis sinubus rotundatis apertis, lineis tribus clavatis apice divergentibus infra isthmum.
Java, *T. Lobb* (205).

A stout erect plant, with a stem half an inch in diameter, and leaves 6 inches long. I can find no tubercle on the foot of the column; nor can I identify it with any of Blume's plants.

318. E. APOROIDES; foliis brevibus obtusis acinaciformibus equitantibus, pedunculis unifloris, bracteis linearibus obtusis carnosis, floribus glabris, sepalis petalisque ovatis obtusis, labello acute 3-lobo lobo intermedio majore carnoso.
Philippines, *Cuming*.

This has very much the appearance of the plant figured by Adolphe Brongniart as *Aporum incrassatum* (Duperrey, t. 42 B); but the lip is 3-lobed, not entire.

§ XI. UROSTACHYA.

The caulescent species with numerous leaves, and long racemes or panicles of flowers, without the woolly lip-appendages of § ERIURA, form a natural group which may be conveniently placed apart from others. The flowers, with the exception of *E. bambusifolia*, are very small and densely arranged.

319. E. floribunda, *Lindl. in Bot. Reg.* 1844, t. 20.
Java, *hb. Junghuhn* (307); Mergui, *Griffith*.

Of this *E. leucostachya* of the Hort. Soc. Journ. III. XV. and XVI. is, as was then suggested, a mere variety.

320. E. micrantha, *Lindl. Gen. and Sp. Orch.* p. 68.
Java, *Lobb* (314).

The *Octomeria racemosa* of Kuhl and Hasselt seems, from a tracing sent me by Prof. Reichenbach, to be this plant, which is very like *E. floribunda*, but with smaller flowers, and with the lip-auricles perfectly lateral and not intralabellar.

321. E. PACHYSTACHYA; foliis oblongo-lanceolatis nervosis, spicis densissimis elongatis glabris, bracteis squamiformibus reflexis, floribus (minutis) tomentosis mento elongato incurvo, petalis glabris linearibus obtusis falcatis sepalis brevioribus, labello sessili oblongo acuto lævi.
Java, *Junghuhn* (298).

322. E. RETROFLEXA; foliis anguste oblongis spicis tenuibus duplo

longioribus, bracteis oblongis glabris retroflexis, floribus glabris, sepalis petalis labelloque subæqualibus ovatis acutis.

Philippines, *Cuming*.

The lateral sepals are very little oblique, and the lip is scarcely distinguishable except in being more fleshy; it is quite destitute of all superficial processes.

323. E. BAMBUSIFOLIA; foliis oblongis acuminatis nervosis paniculis terminalibus laxis tomentosis multifloris subæqualibus, sepalis ovatis obtusis tomentosis, petalis obovatis acutis, labello ovato plano glabro inappendiculato apice dilatato.

Khasija, *Griffith*; at 2000 feet, *Mr. Simons, in hb. Hooker*. (64).

I have no species very nearly allied to this, whose great leaves resembling a Bamboo, and loose tomentose terminal panicles as much as 10 inches long, are very peculiar.

PHREATIA, *Lindl. Gen. & Sp.* p. 63.

Prof. Reichenbach has detected the identity of Plexaure, *Endlicher*, with this well-marked genus. But he has referred it to Eria, to which I must withhold assent. The bifid somewhat cartilaginous rostellum, which led Endlicher to refer the genus to Neottieæ, appears to afford an absolute mark of distinction, especially when accompanied, as in this case, by a very peculiar and scarcely mistakeable habit. Blume refers *Phreatia elegans* to Thelasis (*Mus. Lugd. Bat.* ii. p. 187), for reasons which I am unable to appreciate. No two genera can be more wholly distinct. In Hooker and Thomson's herbarium one species only occurs; but a few may be added from other sources, in addition to those described by Prof. Reichenbach.

324. Phreatia elegans, *Lindl.* l. c. (Thelasis elegans, *Blume, Mus. Lugd.* ii. 187.)

Khasija, 4000 feet, *J. D. H. & T. T.* (93).

325. PH. MYOSURUS; foliis membranaceis late loratis planis apice obliquis cuspidatis basi equitantibus, spicis elongatis folio multo longioribus, floribus subverticillatis, bracteis fuscis acuminatis floribus longioribus, labello cuneato juxta apicem biplicato quasi trilobo. (Eria [Phreatia] myosurus, *Rchb. f. in Bonplandia*, March 1, 1857.)

Java, *Lobb* (166 *in hb. Hooker*.).

The largest of the genus except A. Richard's two "Oberonias," *gladiata* and *micrantha*, which Professor Reichenbach has pointed out to be Phreatias. *O. micrantha* especially seems very near this; but the bracts are represented as being much shorter than even the pedicels. Flowers very small, hardly longer than the cinnamon-brown bracts, and arranged in a somewhat verticillate

manner. The lip is so dilated and folded near the end as to seem to be 3-lobed.—Possibly A. Brongniart's *Oxyanthera micrantha* may be this; but if so, the inflorescence is taken from another plant, perhaps the Thelasis, which furnished his magnified dissections (as Prof. Reichenbach has pointed out to me in conversation). My learned friend's definition of his *Eria myosurus* appears to have been taken from an incomplete specimen, for which reason the above specific character is now proposed.

326. PH. MINUTIFLORA; foliis linearibus coriaceis recurvis equitantibus obtusis spicis tenuibus æqualibus, bracteis triangulo-setaceis, labello obovato concavo.

Borneo, *Lobb.*

Leaves about 2 inches long. Flowers the smallest in the genus, in an erect very slender spike. Bracts brown, setaceous, broad at the base.

327. PH. MICROTIDIS; foliis linearibus coriaceis equitantibus apice acutis recurvis spicis densis angulatis æqualibus, bracteis floribus brevioribus, labello orbiculari concavo basi pandurato.

Java, *Lobb.*

Much like a pigmy *Microtis*, the whole plant not exceeding 2 inches in height. Blume's *Dendrolirium pusillum*, formerly referred by me to Phreatia (Gen. & Sp. p. 64), seems to be rather an Appendicula, and can have nothing to do with the present species.

328. PH. TAHITENSIS; folio oblongo coriaceo plano oblique bilobo spicæ densæ multifloræ æquali, scapo trivaginato, mento oblongo obtuso, labelli acuti rhombei longe unguiculati angulis lateralibus runcinatis, bracteis oblongis herbaceis acutis canaliculatis florum longitudine.

Tahiti, *Bidwill.*

Plant between 3 and 4 inches high, of which 1½ inch is occupied by a dense spike whose flowers are the largest in the genus, measuring in their dried state nearly ⅛th of an inch in length. The lateral sepals are extended into a long blunt chin, which probably led M. Reichenbach to remark, that "here the genera Phreatia and Eria run together." But the cartilaginous bifid rostellum of the former genus is perhaps more strongly marked in this than in any other species.

THELASIS, *Blume.*

The extremely short characters assigned by Prof. Blume, both in his 'Bijdragen,' and in his recent 'Museum Lugd. Bat.,' to the species of this curious genus, render all attempts at identifying his plants almost hopeless—especially since, in the latter work,

he has referred to the genus so wholly different a plant as *Phreatia elegans*. The only species known at present on the continent of India itself, furnishes some addition to the perplexity that surrounds the genus.

329. Th. pygmæa. (Euproboscis pygmæa, *Griffith, in Calcutta Journal of Nat. Hist.* v. 372. t. 26; *Wight. Ic.* t. 1732, not 1733.)
Khasija hills, *Griffith, Lobb*; at 2000–4000 feet elevation, flowers white, *J. D. H. & T. T.* (29).

Griffith's figure of his *Euproboscis pygmæa*, in the Calcutta Journal, is sufficient for the identification of this plant, which seems to be common on the Khasija mountains. In that work the name *E. Griffithii*, quoted by Prof. Reichenbach (Bonplandia, Feb. 15, 1857), does not occur. Prof. Blume refers it to his *Th. capitata* which differs in having a "spica densa ovoidea deinde cylindrica," and an ovate obtuse lip, a description that in no way applies to this. Dr. Wight's figure is a good one, but from a small specimen whose flowers are in a state of Peloria. The name *pygmæa* is objectionable, for there are specimens before me as much as 8 inches high; it must however stand. A Thelasis from Hong Kong, sent by Dr. Hance (287), appears to be either this or *Th. triptera*; but my specimens are not good enough for positive determination.

330. **Th. ochreata; folio coriaceo lorato obtuso canaliculato basi squama maxima laxa truncata stipato, scapo foliis duplo breviore vaginis maximis laxis truncatis baseos binis medii solitaria, spica densissima bracteis reflexis acutis amplexicaulibus duris concavis, ovario obovato, sepalis alte carinatis supremo galeato, labello ovato obtuso.**
Borneo; low forests of Sarawak, *T. Lobb*.

I should have thought that this might have been Blume's *Th. capitata*, judging from his latest definition; but Prof. Reichenbach, who has carefully examined that plant, describes the leaves as cuneate and equally 2-lobed, and the sepals entirely without carinæ. The leaves are a foot long when full-grown.

I have two or three more species of the genus, but until some authentic evidence concerning Blume's plants reaches me, I cannot venture to name them.

A Note upon Pseudocentrum, a New Genus of *Orchidaceæ*. By Prof. Lindley, F.R.S.

[Read March 4th, 1858.]

Among the numerous collections of Peruvian Orchids which have been communicated to me from time to time by my excellent corre-

spondent Professor Jameson, there is one possessing so very extraordinary a structure that it seems worthy of being brought separately under the notice of the Society, although nothing more is known of it than that it is a terrestrial plant from the valley of Lloa, a couple of spikes of flowers having alone reached me.

These spikes are dense, erect, cylindrical, 10 inches long, and very slightly coated with minute distant hairs. A thin lanceolate three-veined bract supports each flower, reaching beyond the summit of the ovary. The flowers themselves are not unlike, in general appearance, those of a minute *Aconitum lycoctonum*, being furnished with what seems at first sight to be a slender curved galea many times longer than the limb; but upon dissection this galea proves to consist of the two lateral sepals excessively produced at their base and forming a sheath, within which the labellum lies concealed. Thus far there is nothing in the structure to which a parallel may not be found elsewhere, as in Dendrobium, Bifrenaria, Comparettia, and especially in Pelexia, a genus to which the plant before us is nearly allied. But when the labellum is examined, it is found to be extended within the fold of the lateral sepals, not in the form of a spur arising from its base, but in that of a long slender channeled body proceeding from its point, the base of the labellum being acutely hastate. In other words, the labellum is sessile, hastate, 3-lobed, with the middle lobe extremely long, linear, channeled, and directed upwards between the sepals which conceal it. In this manner the appearance of a spur is produced without recourse being had to the arrangement which occurs in every other genus of this large order, hitherto described; for which reason I propose the name PSEUDOCENTRUM, to which the following technical character may be added:—

PSEUDOCENTRUM (Genus Neottiearum Pelexiæ affine). Herba terrestris;......... *Spica* elongata, densa, striata, cylindracea. *Ovarium* rectum. *Sepalum* anticum parvum, lanceolatum, patens; lateralia dorsalia, multo majora, triangularia, basi in canalem longum ascendentem arcuatum obtusum producta. *Petala* lineari-lanceolata, apice recurva, sepalo antico breviora. *Labellum* membranaceum, sessile, trilobum; lobis lateralibus acutis hastam referentibus, intermedio lineari, canaliculato, intra canalem sepalinum incluso eique æquali. *Columna* nana, semiteres; stigmate depresso marginato, rostello acuminato. *Anthera* dorsalis apiculata, bilocularis (?); *pollinia* 4, pulverea, lateralia majora glandula parva oblonga.

Sp. 1. *Pseudocentrum macrostachyum*. Peru, *Jameson*.

Synopsis of *Legnotideæ*, a tribe of *Rhizophoraceæ*.

By GEORGE BENTHAM, Esq., F.L.S.

[Read March 4th, 1858.]

AMONG the plants of the great East Indian collection distributed by the late Dr. Wallich, is one from Heyne's Peninsular Herbarium, entered in the catalogue under the number 6320 as *Blepharistemma corymbosum*, Benth. I have no recollection nor any record of having ever given it that name, and I feel certain that I never examined it. The specimen which I received from Dr. Wallich in 1832 has remained ever since unnamed in my herbarium, but meeting with it accidentally a short time since, and ascertaining that it bore a name supposed to have been given by myself, I have been led to examine it in detail, and to pass in review the allied genera forming the small but interesting group of *Legnotideæ*, a tribe of *Rhizophoraceæ*. Although most of these genera have been well described by Arnott, Blume, Korthals, Asa Gray and others, yet as they have not all been brought together in a comparative form, I am induced to lay before the Linnean Society a short synopsis of the tribe.

The *Legnotideæ* agree with the true *Rhizophoreæ* in their opposite undivided leaves with interpetiolar stipules, their axillary inflorescence, valvately lobed calyx, perigynous petals often fringed or divided at the top and folded over the anthers in the bud, their perigynous definite stamens with versatile 2-celled anthers, their several-celled ovary with two or more collateral or clustered pendulous ovules in each cell (rarely one-celled by the disappearance of the dissepiments between the placentas), and in their simple style with a capitate or discoid stigma, either entire or radiating into as many lobes as placentas. The chief difference consists in the seed, which in the true *Rhizophoreæ* is exalbuminous, the embryo germinating and forcing its radicle through the pericarp whilst still adherent to the tree; whereas in the *Legnotideæ* the embryo is imbedded in a fleshy albumen. In the true *Rhizophoreæ* the seed-bearing part of the ovary is inferior or adnate to the base of the calyx; in the *Legnotideæ* it is either inferior, or superior and free with the exception of the broad base.

With regard to the affinities of *Legnotideæ* as illustrating those of *Rhizophoraceæ*, there is little to add to those suggested by R. Brown in the Appendix to Tuckey's 'Congo,' p. 437, and confirmed by subsequent observers,—a general affinity with *Cunoniaceæ* and with *Lythraceæ*. With the former, *Legnotideæ* agree in their

opposite leaves with interpetiolar stipules, their valvate calyx, and in many respects in the general arrangement of the parts of the flower; but differ in inflorescence, in the æstivation of the petals, in the more complete consolidation of the styles (although in the latter respect they agree with *Broussaisia*), and in the pendulous collateral or clustered ovules. With *Lythraceæ* they agree more generally in habit and inflorescence, in the æstivation of the calyx, and completely consolidated styles; and where the ovary is free, it is often enclosed in the base of the calyx, as in *Lythraceæ*; they differ, however, in their dotted leaves, interpetiolar stipules, in the æstivation of the petals and insertion of the ovules, and in their albuminous seeds. The arrangement of the petals and stamens is also somewhat different, even in the genera which have the ovary free, as in *Lythraceæ*. In the latter order, the disk which bears the petals and stamens is so completely combined with the calyx-tube as scarcely to thicken it, or form any perceptible border at its edge, where the petals are inserted close among the calyx-teeth, and the stamens are usually inserted more or less irregularly lower down on the inner face of the disk. In *Legnotideæ*, the disk, whether very short in the base of the calyx-tube, or lining the tube up to the teeth or lobes, is always very perceptible, and sometimes thick and fleshy; its margin is usually more or less prominent, either as an entire or crenate ring, or as a short cup-shaped tube round the ovary; the stamens are usually inserted either on the margin, or more frequently just below the margin on the outside, and the petals outside the stamens at the base of the disk, that is, in the angle which the free part of the disk makes with the calyx-tube. It is probably this disk which induced Dr. Wallich originally to consider the *Gynotroches* as a species of *Microtropis* among *Celastrineæ*.

The fringed and folded petals of most *Legnotideæ* have perhaps some analogy to the crumpled petals of *Lythraceæ*; the manner in which they are folded over the larger stamens, or over all the anthers, has some analogy to the hooded petals of *Rhamnaceæ*, which enclose the anthers in the bud; but there is very little other affinity with that order. So the opposite dotted leaves or the inflorescence give a general resemblance, without much affinity, to *Myrtaceæ* and *Memecyleæ*.

The fringed petals of Gardner's *Anstrutheria* had induced him to refer that plant to *Elæocarpeæ*; but that and the valvate calyx are almost the only characters in which the *Legnotideæ* coincide with that tribe; still less can I see any affinity between *Legnotideæ*

and *Loganiaceæ*, near which Lindley places them in his 'Vegetable Kingdom.' The free petals and their æstivation, the stamens inserted on a perigynous disk, not in the tube of an essentially gamopetalous corolla, the placentation and other points, appear to me to remove them far away from any of the orders between which the *Loganiaceæ* form the connecting link.

The number of genera of *Legnotideæ* now known is nine; but as they most of them consist of only one or two species, and some are but imperfectly known, it is probable that a better acquaintance with the flora of their chief geographical area—across tropical Africa, through the Mascarene Islands, Ceylon and the Indian Archipelago to tropical Australia,—may enable their future consolidation into natural groups. Of these genera, three, *Carallia*, *Pellacalyx* and *Haplopetalum*, have the seed-bearing part of the ovary and fruit completely adnate or inferior; three, *Gynotroches*, *Crossostyles* and *Anstrutheria*, have the ovary superior, but attached by a broad base to the broadly turbinate calyx-tube; and the remaining three, *Blepharistemma*, *Dactylopetalum* and *Cassipourea*, have the ovary much less dilated at the base, quite free within a campanulate or ovoid calyx, as in *Lythraceæ*.

CARALLIA.

This genus, originally established by Roxburgh, has been more accurately described in detail by Blume, Mus. Bot. vol. i. p. 128. He shows that although the fruit is often by abortion one-celled and one-seeded, the ovary is divided into 4 or rarely 3 or 5 cells with 2 pendulous ovules in each; not one-celled, as stated in Arnott's observations, 'Ann. Nat. Hist.' i. p. 371, in consequence probably of Roxburgh's having so described one of his species. Blume also first described the albuminous seeds of *Carallia* with a curved embryo, which I have verified in different specimens of *C. integerrima*, and in the *C. lanceæfolia* also, as far as I could tell in a not quite ripe fruit.

With regard to the species of *Carallia*, they have evidently been much multiplied. There is one very common one, extending from Ceylon and the Indian Peninsula to Khasiya, China, the Indian Archipelago and north-west Australia. The leaves in the Cingalese specimens are often all obovate and very obtuse; in some Chinese and Philippine Island ones, narrow-oblong and acuminate; in the majority of specimens from the greater part of the area, oval-elliptical, with or without a short acumen; but in each district these forms appear to pass gradually one into the other,

and sometimes on the same specimen. The leaves are generally quite entire; occasionally some may be found with a few very small teeth towards the extremity, but never toothed all round, as in the *C. lanceæfolia.* I have therefore no hesitation in considering this as the *C. integerrima*, DC., to which I would refer the *C. zeylanica, corymbosa* and *sinensis* of Arnott, *C. timorensis*, Bl., *C. octopetala*, F. Muell. (the parts of the flower are often in eights in the Indian specimens), and *Pootia cereopsifolia*, Miq.

C. lanceæfolia, Roxb., is only known to me from specimens from the Calcutta Garden and one or two from Sylhet. It appears well distinguished by the leaves being regularly serrulate all round, and, as far as I have seen, by a more pear-shaped fruit, which appears to ripen generally more than one seed. The leaves are usually considerably broader than those figured by Wight from Roxburgh's drawing. The *C. confinis*, Bl., is evidently closely allied to this species, if not identical with it. *C. symmetria*, Bl., appears to be a form of *C. integerrima* with the leaves slightly toothed at the top.

C. lucida, Roxb., appears to me to be in some respects a made-up species, resulting perhaps in a confusion between *C. integerrima* and *C. lanceæfolia.* The specimens originally sent from the Calcutta Garden as *C. lucida* belong to the broader-leaved forms of *C. lanceæfolia*, although I have not seen any quite so broad as those figured in Roxburgh's 'Coromandel Plants' and in Wight's 'Icones.' Both these figures are taken from Roxburgh's drawings, the work probably of a native artist; and, as is so frequently the case, more or less made up, as is evidenced by the venation of the leaves, so different from that of any *Carallia.* I should therefore be disposed either entirely to reject *C. lucida*, or to consider it merely as an ill-represented variety of *C. lanceæfolia.*

C. celebica, Bl., judging from Borneo specimens which agree with his description, is a distinct species with looser inflorescence, much larger flowers, &c.

C. cuspidata, Bl., and *C. multiflora*, Bl., both from Borneo, but unknown to me, appear from his description to be both of them good species.

Baraldeia, Dup. Thou., is considered by R. Brown, and after him by other botanists, as a species of *Carallia.* It is unknown to me: the Hookerian herbarium, although now rich in Madagascar plants, contains, as far as I can find, no Legnotideous species from that island.

Pellacalyx.

Of the single species known of this genus, *P. axillaris*, Korth., I have seen specimens from Penang, from Phillips's Collection, formerly in the Horticultural Society's herbarium, and among Griffith's Malacca plants. To Korthals's detailed and accurate description I have only to add that the seed, as in *Gynotroches*, is small, ovoid, with a crustaceous testa, and a straight cylindrical embryo in the centre of the albumen. The genus is quite distinct both from *Carallia* and *Haplopetalum* in the form of the calyx and the clustered ovules, as well as in habit and other characters.

Haplopetalum.

I have seen no specimens of this plant; but A. Gray's elaborate description and beautiful plate in the 'Botany of the American Exploring Expedition' are sufficient to characterize it in every respect, excepting the fruit, which is unknown. The habit, inflorescence and flowers are those of *Gynotroches*, except that the petals are sessile and entire, the ovary inferior with a central axis, but not divided into cells, probably from the disappearance of the dissepiments after a very early stage, and that there are but two collateral ovules to each cell.

Gynotroches.

This genus was originally established by Blume in his 'Bijdragen,' but having been referred to *Guttiferæ*, it was very naturally overlooked by Arnott, when describing his *Dryptopetalum*. Blume has subsequently, in his 'Museum Botanicum,' established the generic identity of these two plants, which indeed are probably but one species, not uncommon in the Indian Archipelago. The length of the pedicels and number of parts of the ovary and stigmata vary equally in the Javanese, the Penang, and the Malacca specimens. Blume's third species, however, with minute, almost sessile flowers, from Borneo and Sumatra, is probably distinct. As a genus they differ from *Cassipourea* (of which they have the inflorescence and most of the characters) by the small deeply-cleft calyx, the ovules 4, not 2 only, to each cell of the capsule, and by the terete embryo. As in *Blepharistemma*, the flowers of the common species are to a certain degree diœcious; in some specimens the ovary is slender and empty, whilst the petals and stamens are very fully developed; in others the ovaries are complete and the petals and stamens more or less reduced. This gives to different specimens a very different aspect, and may explain the differences which induced A. Gray to describe as distinct his *G. reticulata* from

Singapore, where, amongst other places, Dr. Wallich gathered the original species.

There are some slight inaccuracies in Blume's dissections of *Gynotroches*. The disk is very incorrectly represented, and in fig. N+, one stamen is inserted outside, and another inside of it; in fact, the filaments are united at their very base into a narrow ring just outside the crenulated margin of the very short disk, whilst the petals are inserted outside the staminal ring. In figs. I+ and N+, the seeds are shown as attached by their lower instead of their upper end. So in fig. O+, the hilum should be represented as near the upper broad extremity, and the upper slender end of the embryo should be the entire radicle, the lower and thicker end being split into the two cotyledons.

Crossostyles.

Forster's detailed description of his *Crossostyles biflora*, published by Guillemin in his 'Zephyritis Taitensis' (Ann. Sc. Nat. Par. sér. 2. vii. p. 353), enabled Asa Gray to recognize it in the plant which he has figured and described in detail in the Botany of the American Exploring Expedition.' Unfortunately these specimens were in some respects imperfect, and the seed has not yet been described. I have, however, little hesitation in referring to the same genus, as a second species, some fruiting specimens collected on the Feejee Islands by Dr. Harvey, differing from the *C. biflora* chiefly in the smaller narrow leaves and in the reduced number of parts of the pistil. The remains of the stamens show that their insertion and numbers were about the same as in *C. biflora*; but there is nothing to indicate the presence or absence of the *nectaries* of Foster, or *sterile stamens* of A. Gray, so peculiarly characteristic of this genus. It is not stated by either, whether they are precisely in the same ring as the stamens, or a little withinside of them. If the latter supposition be correct, they probably represent, not sterile stamens, but the teeth of the disk, which are more or less prominent within the stamens in several *Legnotideæ*. If really alternating with the stamens in the same verticil, there is nothing in the slightest degree analogous to them in any other genus. The seed of *Crossostyles Harveyi* has an embryo much nearer to that of *Cassipourea* than that of *Gynotroches*.

Anstrutheria.

This genus was originally proposed by Dupetit Thouars in his 'Genera Nova Madagascariensia,' under the name of *Richæia*. It

has since, however, at the suggestion of R. Brown (in the Appendix to Tuckey's 'Congo'), been reduced by DeCandolle in his 'Prodromus' to *Cassipourea*; and I described as such, in the 'Niger Flora,' a West African species, which, as I there mentioned, may not improbably be the Congo *Cassipourea* referred to by R. Brown. In the mean time Gardner met with a plant in Ceylon, which he did not immediately recognize as belonging to this group, but conceived to be allied in its fimbriate petals to *Elæocarpeæ.* He accordingly described and figured it in the 'Calcutta Journal' as a new genus of that order, under the name of *Anstrutheria.* Subsequently Major Champion, in a note addressed to Dr. Gardner in 1849, pointed out its relation to *Cassipourea,* and in the Hookerian herbarium it is identified generically with *Richæia* both by Sir W. Hooker and by Planchon. Under these circumstances, the genus, if maintained as distinct from *Cassipourea,* should have retained Dupetit Thouars' name of *Richæia,* were it not that it may be considered as too close, both in sound and derivation, to the previously published *Richea* in *Epacrideæ.* Its union with *Cassipourea* can only be effected with propriety, in the present state of our acquaintance with these plants, by uniting into one genus all the *Legnotideæ* with a free or superior ovarium, from *Gynotroches* to *Cassipourea.* If that view be adopted, the six genera here characterized may be considered as so many sections, and *Anstrutheria* will still be the name to be preferred, whether for a section or a genus. The three species it comprises are evidently closely allied to each other. I have seen abundance of good specimens of the Ceylonese one, which varies with broadly ovate, almost membranous leaves, or much narrower and more coriaceous ones. From the latter form, the West African specimens, which I have in fruit only, and in very young bud, appear scarcely to differ, except in the size of the flowers, which appear to have been considerably smaller; and I have seen no specimen of the Madagascar one. I am therefore quite unable to give at present any distinctive diagnosis of the three species, if such they be.

BLEPHARISTEMMA.

The history of the name and original specimen of the only species constituting this genus has been already given. It was also collected in the Indian Peninsula by Hochstetter, and has been distributed with his Canara plants under the name of *Dryptopetalum membranaceum,* Miq. It is, however, much nearer related to *Cassipourea* than to *Gynotroches*; it scarcely differs indeed

from the American *Cassipoureas* except in habit and inflorescence, in its almost diœcious flowers, and in the rather more dilated stigma. Still the habit is so distinct, that it cannot be joined with *Cassipourea*, unless, as before mentioned, the whole six genera are united into one. The leaves appear to be deciduous, and have none of the coriaceous texture which all other *Rhizophoreæ* acquire, at least when full-grown; the loose cymes are like those of several *Lythrarieæ*. The perigynous disk is cupular, as in *Cassipourea*, but much more developed.

Dactylopetalum.

This genus is founded on a single specimen gathered on the island of Nossi-bé, off the north-west coast of Madagascar, by Boivin. With the habit, inflorescence, and most of the characters of the American *Cassipoureas*, I could not include it in that genus on account of the structure of the ovary, which has no dissepiments and only two pairs of pendulous ovules round the central axis, and the stamens are only twice the number of the petals. The fruit is unknown.

Cassipourea.

This genus must remain restricted to the three tropical American species enumerated in DeCandolle's 'Prodromus.' Additional specimens have proved to me that the *C. serrata* I described among Schomburgk's plants was founded on a specimen of *C. macrophylla* with remarkably toothed leaves, and the *C. quadrilocularis* of Spruce's plants belongs also to the same species, which, as well as the two others, occurs occasionally with four instead of three cells to the ovary. The number of stamens varies in all the species, either four times or five times that of the petals; and in one specimen only of the *C. elliptica*, the one figured in Hooker's 'Icones,' vol. iii. t. 280, does it appear to be generally (but not always?) three times that of the petals.

The genus *Anisophyllum*, Don, or *Tetracarpæa* of Gardner, which I had formerly considered rather as an anomalous *Rhizophoracea* than as a *Hamamelidea*, certainly differs essentially from the former in its alternate leaves, its inflorescence, and more divided styles. Its immediate affinities must, however, remain uncertain until the whole group of small orders clustered round the *Saxifragaceæ* shall have been more carefully reviewed.

The following is the more technical synopsis of the genera and species:—

RHIZOPHORACEARUM tribus 2ᵃ LEGNOTIDEÆ.

Semina albuminosa ante germinationem caduca. Flores quam in *Rhizophoreis* veris vulgo minores. Inflorescentia axillaris, floribus nunc fasciculatis sessilibus v. breviter pedicellatis, nunc in cymas pedunculatas di-tri-chotomas dispositis. Bracteæ ad ramificationes v. ad basin pedicellorum parvæ concavæ, juniores sæpe in cupulam connatæ, per anthesin persistentes v. caducæ. Stamina quæ sepalis opposita in alabastro cum petalis alternant; cætera æstivatione petalis involuta, 1, 2, 3 v. 4 intra quodque petalum. Stigma plus minus peltato-dilatatum (nisi in *Cassipoureis* nonnullis) integrum crenatum v. radiato-lobatum, crenis v. lobis tot quot ovarii loculis.

§ 1. *Ovarii parte ovulifera adnata.*

1. CARALLIA. Calyx supra ovarium campanulatus, lobis brevibus. Stamina numero petalorum dupla. Ovula gemina. Inflorescentia cymosa.

2. PELLACALYX. Calyx supra ovarium campanulatus, lobis brevibus. Stamina numero petalorum dupla. Ovula fasciculata. Pedicelli fasciculati.

3. HAPLOPETALUM. Calyx usque ad ovarium partitus. Stamina numero petalorum quadrupla (v. quintupla?). Ovula gemina. Pedicelli fasciculati.

§ 2. *Ovarium liberum, lata basi calycis tubo turbinato impositum.*

4. GYNOTROCHES. Stamina numero petalorum dupla. Ovula quaterna. Pedicelli fasciculati.

5. CROSSOSTYLES. Stamina numero petalorum quadrupla (v. quintupla?). Ovula gemina. Pedunculi subcymoso-pauciflori. (Discus perigynus lobatus?)

6. ANSTRUTHERIA. Stamina numero petalorum quadrupla (v. quintupla?). Ovula gemina. Pedicelli subfasciculati. Discus perigynus integer v. crenulatus.

§ 3. *Ovarium basi minus dilatatum, in fundo calycis campanulati liberum.*

7. BLEPHARISTEMMA. Stamina numero petalorum dupla. Ovula in ovarii loculis gemina. Inflorescentia cymosa.

8. DACTYLOPETALUM. Stamina numero petalorum dupla. Ovula in placentis ovarii non septati gemina. Pedicelli (brevissimi) fasciculati.

9. CASSIPOUREA. Stamina numero petalorum quadrupla v. quintupla (rarius tripla). Ovula in ovarii loculis gemina. Pedicelli brevissimi fasciculati.

I. CARALLIA, *Roxb.*

Calycis tubus supra ovarium campanulatus, lobis 5–8 brevibus. Discus staminifer usque ad apicem tubi adnatus. Petala tot quot calycis lobi, unguiculata, orbiculata, subserrata v. apice lacera. Stamina numero petalorum dupla, circa disci marginem crenulatum inserta. Ovarii pars ovulifera calyci adnata, 4-(rarius 3- v. 5-) locularis. Ovula in loculis gemina. Fructus abortu sæpius unilocularis, 1-oligospermus. Semen globoso-reniforme, ad hilum impressum. Embryo intra albumen copiosum teres curvatus.—Cymæ pedunculatæ sæpius trichotomæ.

1. C. INTEGERRIMA (*DC. Prod.* iii. p. 33); foliis integerrimis v. versus apicem rarius serrulatis, obovatis ellipticis v. oblongis, floribus 6–8-meris ad ramulos cymarum capitato-sessilibus.—*C. ceylanica, corymbosa* et *sinensis*, Arn. in Tayl. Ann. Nat. Hist. vol. i. p. 371. *C. timorensis*, Bl. Mus. Bot. vol. i. p. 128, ex. char. *C. octopetala*, F. Muell. Pl. Austr. Trop. Occid. *Pootia cereopsifolia*, Miq. Pl. Hochst.

Hab. in Indiæ orientalis sylvis frequens. In ins. Ceylon, *Walker, Gardner*, n. 278; *Kelaart, Thwaites*, n. 1963 et 1964; in Peninsula circa Quilon, *Wight*, n. 2447; in Concan, *Law*; prope Bombay, *Dalzell*; in Terra Canara, *Hochstetter*, n. 307 et 307*a*; in Khasiya, *Griffith*; Sillet, *Hooker* et *Thomson, Wallich Cat.* n. 4880; Sikhim, *Hooker*; in China australi, in ins. Hong Kong, *Champion*; in ins. Philippinis, *Cuming*, n. 1066 et 1027; Mergui et Moolmeyn, *Griffith*; Rangoon, *Maclellan*; (Java et Timor?); in Australia tropica ad Brunswick Bay et York Sound, *Cunningham*; Macadam's Range et Upper Roper River, *F. Mueller*.

Magnopere variat foliorum forma, in speciminibus plerisque Ceylonensibus obovata sunt v. obovali-oblonga obtusissima v. retusa, nonnunquam tamen Indicis omnino similia v. intermedia; in his sæpius ampliora ovali-elliptica obtusa v. plus minus obtuse acuminata, rarius late obovata, v. anguste oblonga; in Sinensibus et præsertim in Philippinensibus pleraque angustiora et longius acuminata, sed in his etiam occurrunt folia Indicis similia; specimina Orientalia et Australasica omnino Indicis similia. Flores etiam magnitudine variant (interdum abortu semi-dioici?). Calyx vulgo circa 2 lin. longus. Cymæ subcorymbosæ ramis brevibus crassis, floribus densius laxiusve depresso-capitatis. Bacca vulgo globosa monosperma, rarius dispermam vidi. Specimina tamen fructifera haud multa vidi.

C. symmetria, Bl. Mus. Bot. vol. i. p. 130, e Java, ex descriptione non differre videtur a speciminibus *C. integerrimæ* foliis apice dentatis.

2. C. CUSPIDATA, *Bl. l. c.* p. 129, e Borneo, ex charactere suo affinis videtur formis angustifoliis *C. integerrimæ*, sed diversa floribus minoribus.

3. C. LANCEÆFOLIA (*Roxb. Fl. Ind.* vol. ii. p. 481; *Wight, Ic.* vol. iii. t. 604); foliis ellipticis oblongisve regulariter serrulatis, floribus 6–8-meris ad ramulos cymarum subcapitato-sessilibus, petalis reniformibus crenulatis.—*C. confinis*, Bl. Mus. Bot. vol. i. p. 129?

Hab. In Sumatra, *Roxburgh*. Specimina quæ vidi omnia ex horto botanico Calcuttensi.

A *C. integerrima* differt imprimis foliis a basi ad apicem regulariter crenulato-serrulatis. Bacca etiam major videtur, turbinato-globosa, 2–3-sperma. Flores iis *C. integerrimæ* similes, minus tamen conferti.

C. lucida, Roxb. Pl. Corom. vol. iii. t. 211, et in Wight, Icon. vol. iii. t. 605 (cujus specimina sicca vidi e horto Calcuttensi) videtur *C. lanceæfoliæ* forma latifolia male depicta.

4. C. CELEBICA (*Bl. Mus. Bot.* vol. i. p. 131, ex charact.); foliis ellipticis oblongisve serrulatis, floribus in cymis trichotomis subpedicellatis, petalis late cordatis fimbriatis.

Hab. (In ins. Celebes, *Blume*), in Labuan, ins. Borneo, *Motley*.

Species bene distincta. Flores 3 lin. longi. Calycis lobi latiusculi tubo breviores. Pedicelli breves et crassi, sed sæpius distincti. Fructus non vidi.

5. C. CALYCINA; foliis ovatis ellipticisve integerrimis, pedunculis longiuscule dichotomis, petalis late cordatis fimbriatis.

Hab. in ins. Ceylon, *Thwaites*, n. 3458.

Ramus adest dichotomus, ad nodos leviter incrassatus. Folia pleraque bipollicaria, breviter acuminata, coriacea. Cymæ quam in *C. celebica* magis elongatæ, pedunculo bis terve bifido, floribus alaribus nullis. Flores fere 4 lin. longi, angustiores quam in *C. celebica*; calycis laciniæ 4, lanceolatæ, crassæ, tubo turbinato sublongiores. Discus parti tubi liberæ brevissime adnatus. Petala lata subreniformia, insigniter fimbriata. Ovarium 4-loculare. Stigma 4-crenatum.—Specimen unicum vidi, floribus paucis, quorum unicum tantum examinavi.

6. C. MULTIFLORA, *Bl. l. c.* p. 131, e Borneo, a me non visa, differre dicitur a *C. celebica* corymbis magis ramosis multifloris, floribus minoribus.

7. C. BARALDEIA, *Arn. in Ann. Nat. Hist.* vol. i. p. 371. Baraldeia, *Dup. Thou. Gen. Nov. Madag.* p. 24, e Madagascaria, quam non vidi, distinguitur imprimis floribus 5-meris, nec ut in præcedentibus 6–8-meris.

Diatoma brachiata, Lour. Fl. Cochinch. p. 296, ab auctoribus verosimiliter haud immerito ad *Caralliam* relata, a *C. integerrima* differre videtur petalis ut in *C. celebica* fimbriatis. Specimina nulla vidi.

II. PELLACALYX, *Korth.*

Calycis tubus supra ovarium campanulatus, lobis 5–6 brevibus. Discus staminifer usque ad apicem tubi adnatus. Petala tot quot calycis lobi, apice lacera. Stamina numero petalorum

dupla, circa disci marginem crenulatum inserta. Ovarii pars ovulifera calyci adnata, 5- (rarius 6-?) locularis. Ovula in loculis plurima (8–12) fasciculata. Fructus subglobosus, carnosus, calycis limbo coronatus. Semina parva ovoidea. Embryo in albuminis axi rectus teres, cotyledonibus vix radicula latioribus.—Pedicelli axillares fasciculati.

Species unica.

P. AXILLARIS, *Korth. in Van der Hoeven et De Vriese, Tijdschr.* vol. iii. p. 20. t. 2.

Hab. in ins. Penang, *Phillipps*; in Malacca, *Griffith.*

Folia oblonga acuminata 4–5-pollicaria supra scabriuscula subtus pube stellata rufescentia. Bacca 3–4 lin. diametro, tubo calycis 2½ lin. longo coronata. Dentes breves reflexo-patentes. Semina iis *Gynotrochis* similia v. paullo majora.

III. HAPLOPETALUM, *A. Gray.*

Calyx fere ad ovarium 4-partitus. Petala 4 subsessilia integerrima. Stamina numero petalorum 4-pla (v. 5-pla?) ad marginem disci brevissimi inserta. Ovarii pars ovulifera calyci adnata, 1-locularis. Ovula 8–10 e columna centrali geminatim appensa. Fructus ignotus.—Pedicelli axillares fasciculati.

Species unica.

H. RICHEI, *A. Gray, Bot. Amer. Explor. Exped.* vol. i. p. 608. t. 76.

Hab. in insulis Feejee.

Habitus folia et flores parvi *Gynotrochis axillaris.*

IV. GYNOTROCHES, *Bl.*

Calycis tubus brevissime turbinatus limbus 4–5-partitus. Petala tot quot calycis laciniæ unguiculata apice lacera. Stamina numero petalorum dupla, disco brevissimo crenulato inserta. Ovarium superum, lata basi calyci impositum, 4–6-loculare. Ovula in loculis 4, fasciculata. Bacca ovoideo-globosa, indehiscens. Semina parva, ovoidea. Embryo in albuminis axi rectus teres, cotyledonibus vix radicula latioribus.—Pedicelli ad axillas fasciculati.

1. G. AXILLARIS (*Bl. Mus. Bot.* vol. i. p. 127. t. xxxi.); pedicellis calyce longioribus. *Dryptopetalum coriaceum,* Arn. in Ann. Nat. Hist. vol. i. p. 372. *Microtropis coriacea,* Wall. Cat. n. 4338. *Gynotroches Dryptopetalum,* Bl. Mus. Bot. vol. i. p. 127. *G. reticulata,* A. Gray, Bot. Amer. Explor. Exped. vol. i. p. 607, ex descr.

Hab. in sylvis montanis Archipelagi Indici, *Blume, Seemann*; in ins. Penang et Singapore, *Wall. Cat.* n. 4338 et 8457; in Malacca, *Griffith, Cuming,* n. 2367; ad Moulmeyn, *Lobb.*

Folia oblonga v. elliptica acuminata, 2–5 poll. longa coriacea reticulato-venosa. Flores in axillis numerosi parvi, brevius longiusve pedicellati, calyce circa 1 lin. longo, abortu subdioici; masculi staminibus petalisque perfectis, ovario sæpius tenui vacuo, stigmate haud dilatato; fœmineo-hermaphroditi longius pedicellati, petalis staminibusque sæpe minoribus his interdum effœtis, stigmate radiato-lobato. Bacca 1¼–2 lin. diametro pleiosperma.

2. G. MICRANTHA, *Bl. Mus. Bot.* vol. i. p. 128, a me non visa, a præcedente differre dicitur floribus minutissimis subsessilibus.
Hab. in Borneo et Sumatra (*Blume*).

V. CROSSOSTYLES, *Forst.*

Calycis tubus brevissime turbinatus, limbus 4–5-partitus. Petala tot quot calycis laciniæ unguiculata, apice lacera. Stamina numero petalorum quadrupla (v. quintupla?) disco brevissimo inserta; filamenta brevia totidem cum staminibus alternantia (an disci laciniæ? an stamina sterilia?). Ovarium superum basi latissima calyci impositum, 5–12-loculare. Ovula in loculis gemina. Fructus carnosus subglobosus in valvulas septicide tardius dehiscens. Semina ovoidea. Embryo in albuminis axi rectus, radicula tereti, cotyledonibus anguste ovatis.—Pedunculi axillares bi–pluri-flori, floribus pedicellatis.

Petala et filamenta sterilia in sola *C. biflora* observata. Semina in *C. Harveyi*.

1. C. BIFLORA (*Forst.*; *Guillem. Zeph. Tait. in Ann. Sc. Nat. Par. ser.* 2. vol. vii. p. 354; *A. Gray, Bot. Amer. Explor. Exped.* vol. i. p. 610. t. 77); foliis amplis obovatis, gynæcio sub-12-mero.
Hab. in insula Societatis Raietea (*Forster*); in Tutuila insularum Samoa (*Amer. Explor. Exped.*).
Folia 4–7 poll. longa, 2–3 poll. lata. Pedunculi 3–4 lin. longi, pedicellis 2–3 (rarius 4) unifloris v. rarius 3-floris.

2. C. HARVEYI; foliis ovali- v. oblongo-ellipticis, gynæcio 5–7-mero.
Hab. in insulis Feejee, *Harvey*.
Arbor? glabra, ramulis ad nodos incrassatis. Folia petiolata, obtusa, coriacea, 2–2½-pollicaria. Pedunculi 2–3 lin. longi petiolo subbreviores, sæpius ad axillas solitarii biflori. Pedicelli pedunculo subæquales. Bracteæ caducæ. Calycis fructiferi tubus late et brevissime turbinatus, laciniis crassis reflexis 2 lin. longis. Discus in calyce fructifero fere obliteratus. Staminum vestigia supersunt numero laciniarum quadrupla, filamento brevi, antheris oblongis. Capsula baccans circa 4 lin. diametro 5–7-locularis, stylo brevi stigmate 5–7-radiato coronata, maturitate valvulis 5–7 crasso-carnosis dehiscens. Semina axi persistenti appensa, ovoidea, duplo fere majora quam in *Gynotrochi*.

VI. Anstrutheria, *Gardn.*

Calycis tubus brevissime turbinatus, limbus 4–5-partitus. Petala tot quot calycis laciniæ unguiculata apice lacera. Stamina numero petalorum quadrupla (v. quintupla?) disco brevissimo inserta; filamentis nullis interjectis. Ovarium superum basi lata calyci impositum, 3- (rarius 4-) loculare. Ovula in loculis gemina. Fructus carnosus subglobosus in valvulas crassas demum septicide dehiscens. Semina ovoidea. Embryo in albuminis axi rectus, cotyledonibus late ovatis.—Pedicelli axillares solitarii v. pauci. Bracteæ quam in *Cassipourea* crassiores, juniores in cupulam connatæ calycem basi amplectentes, demum apertæ v. caducæ.

Species v. formæ tres, patria diversa inter se tamen valde affines, et specimina ad diagnoses conficiendas adhuc non sufficiunt.

1. A. ceylanica, *Arn. in Calc. Journ. Nat. Hist.* vol. vi. p. 344. t. 4.
Hab. in ins. Ceylon, *Klein, Walker, Gardner, Champion, Thwaites, &c.*
Folia variant nunc late ovata tenuiora, nunc ovali-elliptica magis coriacea.

2. A. africana. *Cassipourea africana*, Benth. in Hook. Fl. Nig. p. 341. *C. congoensis*, Br. ex DC. Prod. vol. iii. p. 34?.
Hab. in Africa tropica occidentali, *Vogel.*
Specimina fructifera tantum vidi cum alabastris junioribus; simillima sunt iis e Ceylonensium foliis angustis coriaceis donatis, flores tamen multo minores videntur.

3. A. madagascariensis. *Cassipourea madagascariensis*, DC. Prod. vol. iii. p. 34. *Richæia*, Dup. Thou. Gen. Nov. Madag. p. 25.
Hab. in Madagascaria, *Dupetit Thouars.*
Species a me non visa.

VII. Blepharistemma, *Wall.*

Calyx ovoideus, breviter 4-lobus. Petala in fundo calycis circa discum inserta, unguiculata, apice lacera. Stamina numero petalorum dupla, disco cupulato apice crenato inserta. Ovarium in fundo calycis liberum obovoideum 3-loculare, ovulis in quoque loculo geminis. Fructus ignotus.—Cymæ pedunculatæ axillares corymboso-multifloræ. Flores abortu subdioici.

Species unica.

B. corymbosum, *Wall. Cat.* n. 6320. *Dryptopetalum membranaceum*, Miq. in Pl. Hohenack. n. 713.
Hab. In Indiæ Orientalis Peninsula, *Herb. Heyne*; in Terra Canara prope Pellitschery, *Hohenacker.*
Frutex?, excepta inflorescentia gemmisve novellis glaber. Folia opposita, petiolata, ovali-elliptica v. oblonga acuminata, irregulariter sinuato-

crenata, basi acuta v. rotundata, 4–5 poll. longa, 1½–2½ poll. lata, membranacea, penninervia. Stipulæ interpetiolares lanceolatæ membranaceæ pubescentes, 2–3 lin. longæ, caducissimæ. Cymæ ad axillas v. ad basin innovationum oppositæ, pedunculo semipollicari fultæ, 2–3-chotomæ, floribus 20–30 et ultra. Pedicelli circa lineam longi. Calyx ovoideo-campanulatus, 1½ lin. longus, crassiusculus, superne extus minute hirtellus, lobis vix ad tertiam partem attingentibus. Petala marium calyce duplo longiora. Stamina paullo breviora uti petalorum ungues ciliata. Discus ¾ lin. longus, a calyce fere omnino liber, apice 8-dentatus. Ovarium angustum vacuum stylo brevi. Petala in floribus fœmineis breviora. Stamina minora antheris parvis (effœtis?). Discus minor, sæpe fissus. Ovarium obtuse subtrigonum. Stylus calyce longior, stigmate obsolete trilobo.

VIII. Dactylopetalum, *Benth.*

Calyx campanulatus breviter 5-lobus. Petala in fundo calycis circa discum inserta, unguiculata, apice lacera. Stamina numero petalorum dupla disco cupulato leviter crenato inserta. Ovarium in fundo calycis liberum uniloculare, ovulis 4, per paria circa axin pendulis. Fructus ignotus.—Flores in axillis glomerati subsessiles.

Species unica.

Dactylopetalum sessiliflorum.

Hab. In ins. Nossi-bé, *Boivin.*

Arbor? glabra. Stipulæ breves, caducæ. Folia petiolata oblongo-elliptica, breviter acuminata, integerrima, 3–4-pollicaria, coriacea. Flores ad axillas conferti subsessiles, ut videtur ebracteati. Calyx vix 2 lin. longus, lobis obtusis. Petala paullo longiora, uti stamina glabra, apice in lobos circa 5 digitatim fissa. Discus quam in *Blepharistemmate* brevior. Stigma vix dilatatum.

IX. Cassipourea, *Aubl.*

Calyx campanulatus, breviter 4–5-lobus. Petala in fundo calycis circa discum inserta, unguiculata, apice profunde fimbriato-lacera. Stamina numero petalorum 4–5-pla (rarius tripla), disco cupulato apice vix crenulato inserta. Ovarium in fundo calycis liberum ovoideum v. globosum 3-loculare (rarius 4-loculare), ovulis in quoque loculo geminis. Stigma vix dilatatum. Fructus carnosulus ovoideus in valvulas carnosulas septicide subdehiscens.—Flores in axillis glomerati, sessiles v. breviter pedicellati. Species tres, omnes Americanæ, in Prodromo Candollii enumeratæ, inter se valde affines sunt.

1. C. elliptica (*Poir. Dict. Suppl.* vol. ii. p. 131; *Hook. Ic.* vol. iii. t. 280); foliis ovatis ellipticisve integerrimis, floribus distincte pedicellatis.

Hab. in insulis Americæ æquinoctialis; in ins. Jamaica, *Purdie*; Dominica,

Imray; Sti Vincentii, *Anderson, Guilding*; et in America centrali prope Chagres, *Fendler*, n. 191; in ins. Coyba Novæ Grenadæ, *Seemann*.

Folia vulgo basi magis angustata quam in sequentibus. Calyx 2 lin. longus.

2. C. GUIANENSIS (*Aubl. Pl. Gui.* vol. i. p. 529. t. 211); foliis ovatis ellipticisve integerrimis, floribus subsessilibus.

Hab. in Guiana Anglica, *Hancock, Rob. Schomburgk*, coll. ii. n. 84 et 853; *Rich. Schomburgk*, n. 32 et 1473; in Cayenne, *Martin*; in Surinamo, *Hostmann*, n. 1170.

Folia basi sæpius obtusa, rarius acuta, petiolo brevi nunc brevissimo. Calyx circa 1½ lin. longus.

3. C. MACROPHYLLA (*DC. Prod.* vol. iii. p. 34); foliis ellipticis oblongisve superne hinc inde repando-dentatis, floribus subsessilibus. *C. serrata*, Benth. in Hook. Journ. vol. ii. p. 223, et *C. quadrilocularis*, Benth. in Spruce, Pl. Exs.

Hab. in Guiana Anglica ad flumina Essequebo et Rupununy, *Rob. Schomburgk*, coll. i. n. 527; in Brasilia boreali ad flumina Amazonum et Rio Negro, *Martius, Spruce*.

Folia vulgo 4–6-pollicaria, hinc inde tamen iis *C. guianensis* similia. Flores quam in præcedentibus majores. Calyx 2¼ lin. longus.

Notice of the Re-discovery of the Genus *Asteranthos*, Desf., by Mr. Spruce. By GEORGE BENTHAM, Esq., F.L.S.

[Read April 1st, 1858.]

THE plant, of which I here exhibit a specimen, has excited much interest, as well from its close relationship to the African *Napoleona*, as from the uncertainty of the origin of the only specimen hitherto known. This specimen, or rather fragment, was part of a herbarium brought from Portugal to the Museum of the Jardin des Plantes of Paris in the commencement of the present century, and which contained, together with several plants from the Brazilian provinces of Pernambuco and Rio Negro, others from Angola in Africa. From this fragment, consisting of a branch with two leaves and a few loose flowers, Turpin made up the figure in the 'Annales du Muséum,' and Desfontaines drew up his description. Adrien de Jussieu afterwards dissected one of the loose buds, and as the result showed a great affinity to the *Napoleona* and to no other plant known, it was supposed that the *Asteranthos* also was probably African, but had been misplaced into the Brazilian portion of the above-mentioned herbarium, by some confusion in sorting it, either in Portugal or on its arrival in Paris. Mr. Spruce, however, has now proved that its Brazilian origin was perfectly correct. He found it in great abundance on the banks

of the Guainia, the name given to the Guainiu above its confluence with the Casiquiare, and also on the Atabapo, an affluent of the Orenoco below its junction with the Casiquiare. He describes it as a tree of 30 or 40 feet in height, with slender branches, and handsome, very highly scented, yellow flowers. He found the number of folds of the corolla to vary from 22 to 26; I have counted 28 in some flowers; and in a loose corolla which he found floating very far down the Rio Negro there are 35.

Adrien de Jussieu (Ann. Sc. Nat. iii. 2. p. 227) states that, in the bud he examined, he found a 5-celled ovary with three or four pendulous ovules in each. In the flowers I have examined I find six cells, corresponding to the six raised ribs of the base of the style described by Desfontaines. The four pendulous ovules in each cell are precisely as in *Napoleona*.

There being no fruit with these specimens, they add but little to what was already known as bearing on the much-disputed question of the affinities of these plants. I cannot enter into Jussieu's views of their proximity to *Sapotaceæ*; but it appears to me that everything confirms Lindley's views of their affinity with *Myrtaceæ*. Indeed if we include in that family the *Barringtonieæ* and *Lecythideæ*, we can scarcely exclude *Asteranthos*. The tendency to the union of the petals and stamens in concentric rings may be traced in several plants of the group.

Monograph of the *Eucalypti* of Tropical Australia; with an Arrangement for the use of Colonists according to the Structure of the Bark*. By Dr. FERDINAND MUELLER, Government Botanist, Victoria, Australia. Communicated by Dr. J. D. HOOKER, V.P.R.S., F.L.S.

[Read February 18, 1858.]

CONSPECTUS EUCALYPTORUM AUSTRALIÆ INTERTROPICÆ ET SUBTROPICÆ.

I. *Folia alterna, latitudine conspicue longiora.*

§ 1. *Valvæ prorsus exsertæ.*

1. *E. tereticornis.* Operculum conico-subulatum.
2. *E. rostrata.* Operculum hemisphæricum, rostratum.
3. *E. brevifolia.* Operculum hemisphæricum, muticum.

* The accompanying MS. has been compared with the specimens from Dr. Mueller and A. Cunningham in the Hookerian Herbarium, by Mr. Allan Black, Curator of the Herbarium, who has added some habitats and notes.—J. D. H.

4. *E. patellaris.* Operculum patellare, umbonatum.
5. *E. exserta.* Operculum conicum, obtusum.

§ 2. *Valvæ semiexsertæ.*

6. *E. signata.* Operculum hemisphæricum; fructus semiglobosus.
7. *E. hemilampra.* Operculum elongato-conicum; fructus turbinatus.
8. *E. semicorticata.* Operculum acuminatum; fructus semiglobosus.
9. *E. leptophleba.* Operculum ...... ; fructus semiovatus.
10. *E. microtheca.* Operculum ...... ; fructus minutus, semiovatus.
11. *E. fibrosa.* Operculum tenui-conicum; fructus semiglobosus.
12. *E. crebra.* Operculum semiovatum; fructus semiovatus.

§ 3. *Valvæ omnino inclusæ.*

13. *E. variegata.* Operculum hemisphæricum; fructus semiovatus.
14. *E. tessellaris.* Operculum patellare; fructus semiovatus.
15. *E. polycarpa.* Operculum ...... ; fructus oblongo-ovatus.
16. *E. terminalis.* Operculum ...... ; fructus subcampanulatus.
17. *E. dichromophloia.* Operculum semiovatum; fructus urceolatus.
18. *E. trachyphloia.* Operculum ...... ; fructus semiovatus.
19. *E. bicolor.* Operculum hemisphæricum, ecostatum; fructus semiovatus.
20. *E. ptychocarpa.* Operculum hemisphæricum, costatum; fructus subcampanulatus.
21. *E. aurantiaca.* Operculum hemisphæricum, costatum; fructus urceolari-campanulatus.
22. *E. phœnicea.* Operculum ...... ; fructus urceolaris, ecostatus.

§ 4. *Species fructu ignoto.*

23. *E. citriodora.* Operculum hemisphæricum?
24. *E. tectifica.* Operculum acuminatum.

II. *Folia alterna, latitudine vix aut paulo longiora.*

25. *E. populnea.*

III. *Folia opposita vel subopposita, latitudine vix aut paulo longiora.*

§ 1. *Valvæ prorsus exsertæ.*

26. *E. platyphylla.*

§ 2. *Valvæ semiexsertæ.*

27. *E. melanophloia.*

§ 3. *Valvæ omnino inclusæ.*

28. *E. latifolia.* Operculum ...... ; fructus subcampanulatus.
29. *E. aspera.* Operculum ...... ; fructus minuti, subcampanulati.
30. *E. ferruginea.* Operculum ...... ; fructus globoso-ovati.
31. *E. melissiodora.* Operculum conico-hemisphæricum; fructus campanulati.

§ 4. *Species fructu incognito.*

32. *E. bigalerita.* Operculum duplex.
33. *E. floribunda.* Operculum patellare.

IV. *Folia opposita, latitudine conspicue longiora.*

34. *E. tetrodonta.*

V. *Sectio dubia.*

35. *E. brachyandra.*
36. *E. clavigera*, A. Cunn.
37. *E. odontocarpa.*
38. *E. pachyphylla.*

I. *Folia alterna, latitudine conspicue longiora.*

§ 1. *Valvæ prorsus exsertæ.*

1. EUCALYPTUS TERETICORNIS (*Smith in Trans. Linn. Soc.* iii. 284). E. subulata (*All. Cunn, ex Schauer in Walp. Rep. Bot. Syst.* ii. 924). Excelsa, ramulis tenuibus teretiusculis, foliis alternis longiuscule petiolatis elongato-lanceolatis subfalcatis concoloribus vix nitidulis pellucide punctatis penniveniis, vena longitudinali a margine remota, umbellis 4–6-floris, pedunculis axillaribus lateralibusque solitariis pedicellos longitudine excedentibus angulosis, calycis ecostati *operculo conico-subulato subcurvato* tubi hemisphærici longitudinem pluries excedente, *capsulæ* semisuperæ subglobosæ quadriloculatæ *valvis alte exsertis* deltoideis, seminibus apteris.

Hab. In montosis planitiebusque Australiæ orientalis usque ad flumen Burdekin. Anth. vere. (Brisbane River, *Frazer*, in hb. Hook.)

Arbor trunco utplurimum recto, cortice undique cinereo lævi in stratis tenuibus fuscescentibus secedente. *Folia* longitudine inter 3 et 7″ varia, inferne 6–10‴ lata, in apicem longe sensimque angustata, breviter in petiolum decurrentia. *Calycis* tubus 1‴ parum excedens. *Filamenta* albida. *Operculum* pallidum circiter semunciale. *Capsula* ad ⅓ exserta, fere 3‴ metiens.

Huic *E. rostrata*, Schlecht. et *E. acuminata*, Hook. proximæ, et forsan nonnisi varietatis valore diversæ.

2. EUCALYPTUS ROSTRATA (*Schlechtendal* ! *in Linnæa*, xx. p. 655. E. acuminata, *Hook.* ! *in Mitchell, Trop. Austral.* p. 390). Arborea, ramulis tenuibus apice angulatis, foliis alternis modice petiolatis elongato- vel falcato-lanceolatis opacis prominenter penniveniis pellucide punctatis, vena peripherica a margine remota, umbellis axillaribus solitariis 5–7-floris, pedicellis calycis tubo subduplo longioribus pedunculo conspicue brevioribus quocum tenuibus angulatis, calycis tubo hemisphærico ecostato, *operculo semigloboso conico- vel subulato-acuminato*, fructibus quadriloculatis, *valvis omnino exsertis*, seminibus apteris.

Hab. In Australia tropica et subtropica secus rivulos, circum paludes lacusque, nec minus in pratis tempore pluviali inundatis fere ubique abunde occurrens. Anth. æstate.

Arbor mediocris vel gigantea, ramulis pendulis. *Cortex* præter trunci basin cæsio- vel albido-cinereus lævis rudimentis strati superi fuscescentis secedentis tenuibus interdum parce obtectus. *Folia* tenui-coriacea, pleraque 5–8″ longa, inferne 6–10‴ lata, in apicem longe angustata. *Calycis* tubus sesquilinearis. *Operculi* acumen longitudine et forma varians sed potius subito quam (in *E. tereticorni*) sensim protrudens. *Stamina* albida. *Capsula* circiter 3‴ metiens.

Adnot. Operculi acumen nonnunquam rudimento operculi alteri inclusum.

"Yarra-tree," *Mitch. Trop. Austr.* passim. "Flooded Gum-tree," *Leichhardt's Overland Exp.* et colonorum passim. "Red Gum-tree" inhabitantium coloniæ South Australia.

3. Eucalyptus brevifolia. Arborea v. fruticosa, ramulis teretiusculis, foliis alternis angusto- vel ovato-lanceolatis parum curvatis acutis vel sensim acuminatis modice petiolatis subtiliter penniveniis epunctatis, vena peripherica a margine vix remota, umbellis axillaribus paucifloris, pedunculis petiolo brevioribus obscure angulatis, calycis tubo semiovato vel hemisphærico lævi pedicellum duplo excedente operculi semiglobosi mutici longitudinem vix superante, *capsula semi-exserta* 3- raro 4-loculata vertice hemisphærica stylo mucronata, valvis paulo infra marginem insertis, seminibus clathratis apteris.

Hab. In eremis terræ tabularis ad flumina Victoria et Sturt's Creek, in plaga Arnheim's Land et circum sinum Carpentaria. Anth. vere.

Frutex elatior vel arbor minor rarius mediocris, cortice lævi albido-cinerascenti. *Ramuli* fulvi. *Folia* pleraque 2–3″ longa, ½–1″ lata. *Pedunculi* 3–4‴ longi. *Calycis* tubus longitudine 1½–3‴ varians, fructifer hemisphæricus. *Semina* ¾–1‴ longa ovata concavo-convexa fusca.

Variat floribus duplo minoribus.

4. Eucalyptus patellaris. Arborea, ramulis teretiusculis apice vix angulatis, foliis alternis modice petiolatis angusto-lanceolatis subfalcatis longe acutatis parce pellucide punctatis nitidulis subtiliter venosis, vena peripherica margini subcontigua, umbellis terminalibus axillaribusque 3–7-floris geminis vel pluribus paniculatis, pedunculo teretiusculo pedicellis angulatis paulo vel duplo longiore, *calycis tubo campanulato* pedicellum longitudine æquante *operculum patellare umbonatum* duplo excedente, capsulæ quadriloculatæ *valvis prorsus exsertis*.

Hab. Ad rivulos exsiccantes fluvii Roper. Anth. æstate.

Arbor elatior, habitu *E. microthecæ*. *Cortex* sordide canus rugosus et rimulosus in trunco ramisque persistens. *Folia* 3–6″ longa, ½–1″ lata. *Pedunculi* unciales vel breviores. *Calycis* tubus circiter 4‴

longus viridulus. *Operculum* fuscescens coriaceum. *Valvæ* margini calycis adnatæ.

5. Eucalyptus exserta. Arborea, ramulis tenuibus angulatis, foliis alternis angusto-lanceolatis elongatis leniter curvatis modice petiolatis acuminatis opacis pellucide punctatis subtilissime penniveniis, vena peripherica a margine remota, umbellis axillaribus lateralibusque solitariis 3–7-floris, petiolo pedunculum angulatum superante, calyce breviter pedicellato, *operculo conico* obtusiusculo calycis tubum hemisphæricum indistincte costatum duplo excedente, *capsula globosa* 3–5-loculata *semisupera, valvis alte exsertis,* seminibus apteris.

Hab. In pratis minus fertilibus ad fluvium Burnett. Anth. Jan., Febr.

Arbor mediocris vel minor, cortice in trunco ramisque persistente cinereo-fusco rugoso et rimoso, extus frustuloso, intus subfibroso. *Folia* 3-6″ longa, 4–8‴ lata. *Pedunculi* 3–5‴ longi. *Capsula* circiter 3‴ metiens, valvis brevibus deltoideis supra calycis marginem orientibus. *Fructus* igitur non dissimilis ei *E. rostratæ*. *Semina* angulata subtilissime rugulosa fertilia nigrescentia.

Quoad corticis structuram inter arbores Eucalyptorum "Bloodwood-" et "Stringy-bark-trees" vocatas quasi medium tenet, notis specificis ad *E. fibrosam* approximans.

§ 2. *Valvæ semiexsertæ.*

6. Eucalyptus signata. Arborea, ramulis apice angulatis, foliis alternis elongato-lanceolatis falcatis modice petiolatis longe acuminatis opacis prominenter venosis pellucide punctatis, *venis erecto-patentibus*: peripherica a margine remota, umbellis axillaribus et lateralibus 6–10-floris, pedicellis angulatis pedunculo compresso bis terve brevioribus calycem ecostatum vix excedentibus, calycis tubo operculum hemisphæricum apiculatum longitudine duplo superante turbinato, *fructibus parvis hemisphæricis* quadriloculatis vertice planis, valvis vix exsertis, seminibus apteris.

Hab. In collibus et montibus graminosis sylvaticis ad flumen Brisbane. (*Macarthur*, Sydney Woods, Paris Exhib. No. 163, in hb. Hook.) Anth. Nov., Dec.

Arbor elata, "Spotted Gum-tree" in plagis ad Moreton Bay vocata, *trunco* cum ramis lævi e cæsio et albido vel livido *variegato* lineisque flexuosis signato. *Folia* 3–6″ longa, ⅓–1⅓″ lata venis angulo acutiore patentibus percursa. *Pedunculi* 5–9‴ longi. *Stamina* albida ad 2‴ longa. *Operculum* circiter 1‴ altum, interdum obtusum raro acuminatum. *Fructus* circiter 2¼‴ longi.

7. Eucalyptus hemilampra. Arborea, ramulis compresso-tetragonis, *foliis* alternis modice petiolatis curvato-lanceolatis sensim acuminatis pellucide punctatis subtilissime venosis *supra nitentibus, subtus pallidioribus opacis*, vena longitudinali a margine remotiuscula, umbellis 5–7-floris axillaribus lateralibusque solitariis, pedunculo compresso petiolum sequante pedicellis angulosis longiore, calycis

tubo late obconico paucicostato, *operculo elongato-conico* acuto *recto* tubi longitudinem ter quaterve excedente ecostato, fructibus subturbinatis quinqueloculatis vertice convexis, valvis semiexsertis, seminibus apteris.

Hab. Ad rivulos torrentesque sylvaticos secus partes fluvii Brisbane superiores. Anth. Dec., Jan.

Arbor procera, trunco ramisque cinereis lævibus. *Folia* 4–5 poll. longa, inferne ¾–1⅛″ lata. *Pedunculi* ½–1″ longi. *Pedicelli* calycis tubo modo longiores modo breviores. *Operculum* semunciale sordide flavidum. *Filamenta* albida ad ½″ longa. *Fructus* vix 3‴ longi apice non contracti.

E. tereticorni similis, foliis quoque *E. citriodoræ.*

8. Eucalyptus semicorticata. Arborea, ramulis angulatis, foliis alternis lanceolatis subfalcatis modice petiolatis sensim acuminatis opacis subtilissime venosis imperforatis, vena peripherica a margine remota, umbellis axillaribus et lateralibus solitariis 5–8-floris, pedicellis angulatis pedunculo compresso bis terve brevioribus calycis tubo vix longioribus, operculo acuminato calycis tubum semiovatum ecostatum æquante, fructibus hemisphæricis 3–4-loculatis vertice planis, valvis brevissime exsertis, seminibus apteris.

Hab. In nemoribus montium fertiliorum ad flumen Brisbane. (Illawarra, *Macarthur,* Sydney Woods, in Paris Exhib. No. 88, hb. Hook.) Anth. æstate.

Arbor procera, "Blackbut" colonorum. *Cortice trunci* extus *nigrocinereo* intus fusco fibroso, *ramis* denudatis *albidis lævibus. Folia* 2¼–4″ longa, 7–10‴ lata. *Pedunculi* 6–10‴ longi. *Operculum* 2‴ longum semiovatum subrostratum. *Fructus* 3–4‴ longi. *Semina* fusca 1‴ longa angulata subtilissime punctulato-rugulosa.

E. persicifolia, Lodd. non Schl., huc forsan pertinet ex nomine vernaculari "Blackbut" ad hanc a Cunninghamio citato.

9. Eucalyptus leptophleba. Arborea, ramulis inferne teretiusculis superne angulatis lævibus, foliis alternis modice petiolatis falcatolanceolatis epunctatis subtilissime venosis, vena peripherica a margine parum remota, umbellis axillaribus terminalibusque 3–5-floris geminis ternis vel paniculatis, pedunculis angulatis; generali cæteris longiore, pedicellis calycis tubo semiovato brevioribus, *fructibus semiovatis ecostatis* 4–5-loculatis, *valvis subinclusis* deltoideis acuminatis infra marginem insertis.

Hab. In pratis ad flumen Gilbert. Anth. æstate.

Arbor mediocris vel major, cortice sordide cano rugoso et rimuloso in trunco ramisque persistente. *Folia* pleraque 3–5″ longa, ad 1″ lata. *Pedunculi* primarii petiolos æquantes vel superantes. *Pedicelli* calycis tubo varie breviores. *Fructus* 3–4‴ longi ore non contracti. *Valvæ* non nisi apice exsertæ.

E. patellari approximanda.

10. Eucalyptus microtheca. Arborea, ramulis tenuibus teretiusculis, foliis alternis breviuscule petiolatis lineari-lanceolatis subfalcatis acutiusculis opacis imperforatis subtilissime venosis, vena longitudinali margini subcontigua, umbellis axillaribus solitariis vel paniculatis paucifloris, pedunculis angulatis, fructibus parvis semiovatis ecostatis breviter pedicellatis 3–4-locularibus, valvis infra marginem insertis vix emergentibus, seminibus fertilibus nigrescentibus lævibus apteris.

Hab. In Nova Hollandia tropica non rara, planities fertiliores inhabitans. Anth. vere.

Arbor mediocris, *cortice* sordide fusco-cano *rugoso* et rimoso in *trunco persistente, ramis* superne *decorticantibus* cinereis *lævibus. Folia* satis tenuia 2–5″ longa, 4–8‴ lata. *Paniculæ* simpliciusculæ foliis breviores. *Pedunculi* longitudine variantes. *Fructus* 1½–2‴ longi. *Semina* fere ⅔‴ longa peltato- vel truncato-ovata.

11. Eucalyptus fibrosa. Arborea, ramulis compresso-tetragonis, foliis alternis modice petiolatis lanceolato-falcatis acuminatis indistincte vel subtile venosis opacis imperforatis, vena peripherica a margine remota, umbellis axillaribus solitariis geminisque vel terminalibus paniculatis 5–6-floris, pedunculo anguloso petiolum vix æquante, pedicellis calycis tubo semiovato æquilongis, *operculo tenui-conico* obtusiusculo *quam tubus angustiore* et duplo longiore, fructibus hemisphæricis 3–4-loculatis ecostatis, valvis infra marginem affixis breviter exsertis, seminibus apteris.

Hab. In montibus nemorosis ad flumen Brisbane. Anth. æstate.

Arbor magna, suo tractu "Stringy-bark-tree" colonis vocata, trunco recto cum ramis corticem extus rugosum nigrescenti-cinereum intus fibrosum gerente. *Folia* 3–5″ longa, ½–1″ lata. *Calyx* in pedicellum angulatum desinens. *Operculum* 3‴ longum. *Fructus* lignosi 3–4‴ longi.

12. Eucalyptus crebra. Arborea, ramulis teretiusculis apice angulatis, foliis alternis modice petiolatis lanceolato-falcatis acuminatis tenuissime vel indistincte penniveniis imperforatis opacis, vena peripherica a margine remotiuscula, umbellis axillaribus solitariis et terminalibus subpaniculatis 3–6-floris, pedunculis petiolum subæquantibus vel eodem brevioribus pedicellisque angulatis, calycis tubo semiovato ecostato pedicellum longitudine subæquante, *operculo* (juvenili) *semiovato* mutico *tubo* vix æquilongo *angustiore,* fructibus parvis semiovatis 3–4-loculatis, valvis parum convexis paulo infra marginem insertis breviter emergentibus, seminibus apteris.

Hab. A montibus Newcastle-Range usque ad sinum Moreton Bay tam in solo fertiliore quam steriliore præcipue autem montano vel collino sylvas vastas apertas constituens. Anth. æstate.

Arbor minor vel mediocris, *cortice undique persistente rugoso nigrito. Folia* 2–5″ longa, 6–9‴ lata, in petiolum ½–1″ longum angustata. *Fructus* 2–2½‴ longi, orificio non contracti.

"Moreton Bay Ironbark-tree" apud colonos nuncupata.

§ 3. *Valvæ omnino inclusæ.*

13. Eucalyptus variegata. Arborea, ramulis angulatis, foliis alternis modice petiolatis lanceolato-linearibus vel angusto-lanceolatis falcatis elongatis longe acutatis nitidulis crebre penniveniis pellucide punctatis, vena peripherica margini valde approximata, *umbellis paniculatis trifloris,* calycis tubo semiovato operculi hemisphærici longitudinem duplo excedente quocum ecostato, fructibus truncato-ovatis triloculatis pedicello bis–quater longioribus ecostatis vertice planis, valvis inclusis, seminibus apteris.

Hab. In collibus graminosis ad flumen Burnett. Anth. æstate.

Arbor altior, trunco lævi cinereo-albido rudimentis strati extimi corticis cæsiis vel sordide rufescentibus variegato. *Folia* pleraque 4–7″ longa et totidem lineas lata. *Pedunculi* partiales 2–3‴ longi angulati. *Alabastra* ovata. *Fructus* 5–6‴ longi apice sensim contracti.

"Spotted Gum-tree" quorundam colonorum. Habitu vix differt ab *E. tereticorni* et *E. rostrata* nisi trunco stratis extimis corticis basi tenus denudato, nec ad basin stratis corticis vetustis lignescentibus rugosis rimosisque obducto.

14. Eucalyptus tessellaris. Arborea, ramulis inferne teretiusculis superne angulatis lævibus, foliis alternis breviuscule petiolatis angusto-lanceolatis subfalcatis subtiliter penniveniis imperforatis, umbellis axillaribus et terminalibus geminis pluribusve paniculatis 2–4-floris, pedunculis angulatis; generali cæteris longiore, alabastris ovatis pedicello fere duplo longioribus, operculo patellari obtuso, tubo operculi latitudinem paulo et longitudinem multo excedente, fructibus truncato-ovatis ecostatis, valvis inclusis.

Hab. In graminosis tam collium quam planitierum præsertim arenoso-argillaceorum a parte austro-orientali sinus Carpentaria usque ad sinum Moreton Bay. Anth. Nov., Dec.

Arbor mediocris vel major, *cortice in parte inferiore trunci* tantum *persistente* solido squalide cinereo rimis longitudinalibus transversisque numerosis inæqualiter *subtessellato* frustula separabilia formante. Pars trunci superior cum ramis albida lævis. *Ramuli* cum foliis ut in plerisque speciebus penduli. *Folia* pleraque 3–4″ longa, ½–¾″ lata acuminata. *Pedunculi* primarii petiolo parum vel duplo breviores. *Fructus* 4–5‴ longi, apicem versus leniter contracti.

"Moreton Bay Ash," *Leichhardt's Overland Expedition* passim et colonorum.

15. Eucalyptus polycarpa. Arborea, ramulis teretiusculis rigidulis, foliis alternis vel suboppositis breviuscule petiolatis elongato- vel falcato-lanceolatis longe in apicem acutatis nitidulis imperforatis *creberrime et subtilissime penniveniis* subtus parum pallidioribus, vena peripherica margini subcontigua, *umbellis* terminalibus *ample paniculatis* 4–6-floris, pedunculis partialibus pedicellorum longitudinem parum vel duplo excedentibus quibuscum teretibus, fructibus oblongo-ovatis

truncatis exangulatis ecostatis antice sensim contractis basi obtusis 3–4-loculatis pedicello aliquoties longioribus, *valvis profunde inclusis, seminibus antice longe alatis.*

Hab. In locis apricis Novæ Hollandiæ intratropicæ passim. Anth. vere.

Arbor mediocris, cortice ubique persistente, extus sordide cano rugoso et rimoso, intus fuscescente, in frustulis separabili. *Folia* 3–5″ longa, inferne 7–9‴ lata crassiuscule coriacea basi in petiolum semuncialem vel breviorem acutata, apice sæpe in acumen angustum producta. *Pedunculi* generales crassi. *Fructus* cano-viriduli opaci non lævigati, 6–8‴ longi, interdum unciales, ore vix dilatati. *Valvæ* deltoideæ acuminatæ.

E. terminali habitu et cortice persimilis, sed fructibus parum vel duplo minoribus et notis expositis diversa.

16. Eucalyptus terminalis. Arborea, ramulis teretiusculis rigidis, foliis alternis crassiusculis falcato-lanceolatis acuminatis opacis subtilissime penniveniis imperforatis concoloribus modice petiolatis, vena peripherica margini contigua obscura, *umbellis* 3–6-floris *in paniculas amplas terminales congestis*, pedunculis partialibus pedicellos longitudine parum excedentibus quibuscum teretibus, fructibus magnis truncato-ovatis subcampanulatis exangulatis ecostatis quadrilocolatis vertice planis pedicello fere duplo longioribus, valvis marginem subattingentibus, *seminibus antice longe alatis.*

Hab. In pratis et planitiebus siccis fertilioribus Australiæ intratropicæ non rara. Anth. æstate.

Arbor mediocris vel magna, cortice sordide fusco persistente rugoso rimosoque intus fulvo vel ferrugineo in frustulis irregularibus vix parce secedente. *Folia* utplurimum 5–7″ longa, inferne circiter pollicaria vel paulo angustiora. *Fructus* unciam paulo excedentes antice vix contracti.

17. Eucalyptus dichromophloia. Arborea, ramulis subteretibus, foliis alternis modice petiolatis crassiusculis falcato- vel elongato-lanceolatis in acumen longe acutatis vix nitidulis subtilissime venosis imperforatis, umbellis paniculatis 5–7-floris, vena peripherica margini contigua, pedunculis partialibus angulatis pedicello longioribus, alabastris ovatis pedicello æquilongis, tubo operculi mutici hemisphærici longitudinem paulo excedente, *fructibus urceolato-ovatis* vel subglobosis ecostatis quadriloculatis, valvis profunde inclusis deltoideis, *seminibus* fertilibus apice *alatis.*

Hab. In locis minus fertilibus sterilibusve Australiæ intratropicæ passim. Anth. Apr., Mai.

Arbor mediocris vel major. *Corticis stratum superum subpapyraceum læve cinereum* rumpens et tarde secedens ab interiore rufo. *Folia* 3–8″ longa, 6–12‴ lata. *Pedunculi* 4–6‴ longi. *Pedicelli* angulati. *Flores* nondum aperti 3‴ longi. *Fructus* 4–6‴ longi antice leniter contracti; *capsula* a calyce demum secedens.

18. Eucalyptus trachyphloia. Arborea, ramulis angulatis, foliis alternis modice petiolatis angusto-lanceolatis subfalcatis in acumen tenue angustatis opacis subtilissime venosis pellucide punctatis, vena longitudinali margini subcontigua, umbellis paniculatis 3–5-floris, pedicellis pedunculo brevioribus fructu æquilongis angulatis, *fructibus* parvis ecostatis *truncato-ovatis 3-loculatis, valvis* deltoideis *profunde inclusis,* seminibus apteris.

Hab. In collibus ad flumen Burnett. Anth. Sept., Oct.

Arbor mediocris, cortice in trunco ramisque persistente cinereo-fusco frustuloso rugoso. *Folia* 3–5″ longa, 5–8‴ lata, in petiolum 6–9‴ longum paulo angustata, subtus parum pallidiora. *Fructus* circiter 3‴ metientes apice sensim contracti.

19. Eucalyptus bicolor (*A. Cunn. in Mitchell, Trop. Austr.* p. 390. E. parviflora, *Muell. MSS.*). Fruticosa vel arborea, ramulis teretiusculis, foliis alternis lanceolato-linearibus v. lanceolatis leniter curvatis vel falcatis sensim acutatis subtiliter penniveniis nitidulis pellucide punctatis, vena peripherica a margine parum remota, umbellis axillaribus terminalibusque solitariis v. paniculatis 5–7-floris, pedunculis partialibus petiolo vix æquilongis, pedicellis calycis tubo semiovato ecostato æquilongis vel brevioribus, operculo hemisphærico v. semiovato mutico tubo perparum breviore, *capsulis minutis* semiovatis obscure bicostatis apice vix contractis 3–4-loculatis vertice planiusculis, valvis infra marginem insertis inclusis, seminibus apteris.

Hab. In planitiebus collibusque sterilibus a sinu Carpentaria usque ad regiones orientales Australiæ extratropicas. Anth. autumno.

Frutex vel *arbor* minor, cortice sordide cano rugoso in trunco ramisque vestitus. *Folia* petiolo semunciali vel paulo longiore prædita, utplurimum 2½–4½″ longa, 3–6 lineas lata basi acuta. *Calycis* tubus sesquilinearis. *Filamenta* alba ad 1½″ longa. *Antheræ* subglobosæ. *Stylus* staminibus paulo brevior. *Stigma* hemisphæricum. *Capsula* 2–2½‴ metiens. *Semina* fertilia ½–⅔‴ longa nigrescentia angulato-ovata subtilissime rugulosa.

"Scrub Box-tree" peregrinatorum, locos minus fertiles quam *E. microtheca* occupans, absque foliis nitentibus et ramis omnino corticatis jam ex longinquo distinguenda. Arctius ad *E. populneam* approximat. Anth. autumno.

Huic quoque *E. gracilis* et *E. Hookeri* (*E. viminalis,* Hook. in Mitch. Trop. Austr., non Labill.) affines*.

20. Eucalyptus ptychocarpa. Arborea, ramulis angulatis, *foliis magnis* crassis alternis oblique lanceolatis tenui-acuminatis modice

* Major Mitchell's specimens have black bark, and rather large pedicelled flowers. Mueller's, from Burdekin River, have also black bark and small sessile flowers; those from Carpentaria have pale yellow bark, very narrow leaves, and pedicelled capsules.—(A. B.)

petiolatis supra subnitentibus *subtus pallidioribus* penniveniis marginatis imperforatis, vena peripherica margini contigua, umbellis terminalibus paniculatis pauci-septemfloris, pedunculis partialibus pedicellos angulatos duplo triplove excedentibus, *calyce alte octocostato*, operculo hemisphærico tubo bis terve breviore, capsulis magnis ovato-campanulatis alte octocostatis quadriloculatis, valvis profunde inclusis, seminibus fertilibus superne longe alatis.

Hab. Ad rivulos rupestres necnon secus amnes exsiccantes versus originem fluviorum Wentworth, Wickham et Limmen Bight River. Anth. Mart., April.

Arbor media vel major, cortice squalide cano rugoso intus paulo fibroso, undique persistente. *Folia* 5–7″ longa, 1½–2″ lata. *Capsula* 1–1¼″ longa antice paululum contracta, valvis brevibus. *Semina* 2‴ longa (*i. e.* fertilia) alam membranaceam obovatam 3‴ longam gerentia; sterilia numerosa diminuta angusto-alata.

Stirps corticis structura medium tenet inter species vernacule "Stringy-bark-trees" et "Box-trees" vocatas.

21. Eucalyptus aurantiaca. Arborea, *ramulis* teretiusculis cum umbellis *pruinoso-albicantibus*, foliis alternis oblique lanceolatis vel subfalcatis opacis modice petiolatis subtiliter venulosis parce pellucide punctatis, vena peripherica margini subcontigua, umbellis axillaribus lateralibusque solitariis 6–7-floris, *pedunculo* petiolum superante *crasso* subcompresso vel teretiusculo, calycibus sessilibus costatis: tubo turbinato operculi semiglobosi longitudinem dimidio excedente, *fructibus magnis ovato-urceolatis alte octocostatis* inter costas plicatis vel costa tenuiore præditis tri-quadri-loculatis, valvis inclusis brevibus.

Hab. In planitiebus arenosis sicuti in plagis elevatioribus petræis circum sinum Carpentaria, ubi vegetationis ornamentum. Anth. Mai.–Aug.

Arbor major vel mediocris. *Cortex* extus sordide fulvido-canus, *friabilis* facile separandus, *lamellaris*, fibris lignescentibus copiosius intertextus, in trunco tantum persistens. *Rami* validi decorticatione albentes. *Folia* 3–4″ longa, ¾–1″ lata. *Calycis* tubus circiter semuncialis. *Staminum filamenta* ad ¼″ longa *aurantiaca*! *Antheræ* flavæ ovales. *Stylus* viridis stamina æquans. *Capsula* uncialis vel paulo longior sub ore leniter contracta.

Species pulcherrima *E. phœniceæ* cognata, cujus altitudinem sæpe excedit.

22. Eucalyptus phœnicea. Arborea, ramulis fulvescentibus apice angulatis, foliis alternis breviuscule petiolatis tenui-coriaceis oblique lineari-lanceolatis vel subfalcatis opacis parce pellucide punctatis, vena peripherica margini fere contigua, *umbellis* axillaribus et lateralibus pluri-*multifloris*, pedunculo valido pedicellis pluries longiore teretiusculo, calycis tubo fere obconico ecostato, *fructibus* majusculis vix lignescentibus ovato- vel ellipsoideo-*urceolatis* nervosis sub limbo constrictis pedicello pluries longioribus, valvis profunde inclusis.

Hab. In planitiebus elevatioribus collibusque saxosis vel arenosis a fluvio Victoria per terram Arnheim circum sinum Carpentaria. Anth. Jun.–Sept.

Arbor minor vel mediocris. *Cortex* in trunco ramisque persistens, tarde a ramorum parte superiore secedens, extus squalide fulvus, *lamellaris*, fibris lignosis parcius intertextus, *friabilis* et facile separabilis. *Folia* subchartacea 2½–4″ longa, inferne 5–9‴ lata in acumen tenue elongatum terminata. *Stamina phœnicea* vel aurantiaca. *Fructus* uncialis vel paulo longior.

Species formosa *E. miniatæ* affinis cum *E. aurantiaca* et *E. melissiodora* ob corticem micaceo-lamellosum in genere paradoxa.

§ 4. *Species fructu ignoto.*

23. Eucalyptus citriodora (*Hook. in Mitch. Trop. Austr.* p. 235). Arborea, ramulis apice angulatis, foliis alternis modice petiolatis elongato-lanceolatis leviter curvatis sensim longe acutatis subopacis pellucide punctatis tenuissime penniveniis, vena peripherica a margine paulo remota, *umbellis* terminalibus et axillaribus mox lateralibus simpliciter *paniculatis trifloris*, pedunculis angulatis, alabastris late ovatis apiculatis, tubo operculi longitudinem saltem duplo excedente, ...

Hab. In vicinia portus Curtis, *C. Moore.* Anth. autumno.

Arbor elatior, cortice cinereo lævi. *Ramuli* sordide rubelli. *Petioli* compressi obscure canaliculati vix 1″ longi. *Folia* 3–8″ longa, ¾–1¼″ lata tenui-coriacea in petiolum paulo decurrentia saturatius quam plurimorum congenerum viridia concoloria, *odore insigni citreo*! *Paniculæ* foliis breviores ex umbellis paucis constantes. *Bracteæ* et *bracteolæ* valde caducæ; illæ ad basin pedunculorum partialium solitariæ ovato-cymbiformes acutæ 1¼‴ longæ; hæ vix 1‴ longæ ovales concavæ acutæ.

24. Eucalyptus tectifica. Arborea, ramulis tenuibus teretiusculis, foliis alternis tenui-coriaceis breviuscule petiolatis ovato- vel angusto-lanceolatis antice longe acutatis tenui-venosis opacis imperforatis, vena longitudinali ad marginem valde approximata, umbellis axillaribus solitariis vel terminalibus subpaniculatis, pedicellis angulatis calycis tubum æquantibus pedunculo brevioribus, operculo conico acuminato tuboque semiovato æquilongis, ...

Hab. In vallibus graminosis fluminis M'Arthur originem versus. (N. Holl. Sub-Trop., *Mitchell*, in hb. Hook.) Anth. Aug., Sept.

Arbor excelsior, *cortice dilute cinereo rugoso* in trunco ramisque *persistente*. *Folia* semipedalia vel paulo breviora, inferne ¾–1½ poll. lata, venis primariis patentibus, secundariis reticulato-anastomosantibus. *Flores* in specimine collecto nondum bene evoluti. *Pedunculi* tenues 2–3‴ longi. *Alabastra* 2‴ longa, postea forsan aucta. *Fructus* desunt.

Nativis cortex adhibetur ad habitatiunculas perrudes construendas.

II. *Folia alterna, latitudine vix aut paulo longiora.*

25. Eucalyptus populnea (E. populifolia, *Hook. in Mitch. Trop. Austral.* p. 204, non *Desfont.*). Arborea, ramulis tenuibus teretiusculis lævibus, *foliis* alternis *longe petiolatis* ovato- vel rhombeo-*orbicularibus* apice obtusis vel emarginatis basi acutiusculis *utrinque nitentibus* concoloribus pellucide punctatis subtiliter venosis, umbellis 3–7-floris axillaribus vel lateralibus solitariis vel simpliciter paniculatis, pedunculis calycem vix excedentibus, alabastris clavato-ovatis, calycis minuti tubo ecostato in pedicellum brevissimum attenuato operculi hemisphærici mutici longitudinem duplo excedente, *fructibus parvis turbinato-obconicis*, valvis inclusis, seminibus . . . .

Hab. In tractu orientali Novæ Hollandiæ subtropicæ passim sylvas constituens præsertim in collibus fertilioribus. Anth. Oct.–Dec.

Arbor mediocris, cortice sordide fusco-cinereo in trunco ramisque persistente rugoso et rimuloso. *Petioli* tenues teretiusculi sæpe 1″ longi. *Folia* 1½–3″ longa, 1–3″ lata, nonnunquam longitudine latiora. *Pedunculi* partiales 2–4‴ longi. *Calycis* tubus circiter 1½‴ metiens. *Stamina* albida 1‴ vix longiora. *Fructus* maturus deest.

III. *Folia opposita vel subopposita, latitudine vix aut paulo longiora.*

§ 1. *Valvæ prorsus exsertæ.*

26. Eucalyptus platyphylla. Arborea, ramulis teretiusculis, *foliis* alternis vel suboppositis longe petiolatis *ovato- vel cordato-orbicularibus* nunc subrhombeis raro ovato-lanceolatis opacis *prominenter penniveniis* pellucide punctatis, vena peripherica a margine remota, umbellis axillaribus vel lateralibus 3–7-floris, pedunculis angulatis calyci æquilongis vel eo longioribus, calycis breviter v. brevissime pedicellati tubo hemisphærico ecostato operculum semiglobosum muticum læve longitudine æquante, fructibus turbinato-hemisphæricis 3–4-loculatis vertice leniter convexis, *valvis* margini affixis *exsertis*, seminibus apteris.

Hab. In pascuis fertilibus ad flumen Burdekin. (Ora orient. trop., *A. Cunningham*, hb. Hook.) Anth. Sept.–Nov.

Arbor mediocris vel major, cortice trunci ramorumque lævi mox albido, secedentibus stratis extimis tenuibus fuscescentibus. *Petioli* semiteretes 1–1½″ longi. *Folia* tenui-coriacea utplurimum 2–3″ longa sæpe in petiolum breviter decurrentia. *Calycis* tubus 1½–2‴ metiens. *Operculum* pallidius simplex (qua nota a simili *E. bigalerita* præsertim dignoscitur). *Stamina* ad 3‴ longa albida. *Capsula* 2‴ longa.

E. bigaleritæ proxima.

§ 2. *Valvæ semiexsertæ.*

27. Eucalyptus melanophloia. Arborea, ramulis apice tetragonis, *foliis* glaucis raro viridibus fere semper *pruinosis oppositis* sessilibus

e basi amplexante *cordato-ovatis* tenuiter penniveniis et reticulato-venulosis vix pellucide punctatis, vena marginali obliterata, umbellis paniculatis vel axillaribus solitariis 3–6-floris, calycis tubo pedunculo angulato bis terve breviore pedicelli longitudinem parum vel pluries excedente semiovato-tetragono operculum late conicum acutum longitudine parum superante, fructibus semiovatis vel subpyriformibus 2–4-costatis ore parum contractis 4–5-loculatis, valvis infra marginem insertis subinclusis parum convexis, seminibus apteris.

Hab. A tractu montano Newcastle Range usque ad sinum Moreton Bay *Eucalypto crebræ* abunde adsociata, solum sterilius indicans. (N. Holl. Sub-Trop., *Mitchell.* Moreton Bay, *Moore.* Sydney Woods, Paris Exhib. No. 66, in hb. Hook.) Anth. vere exeunte.

Arbor minor, trunco irregulari, *cortice* persistente crasso profunde *sulcato rugoso nigrescente.* *Folia* 1½–3″ longa, 1–2″ lata, obtusa vel cuspidato-acuminata interdum cordato-lanceolata vel rite cordata. *Pedunculi* speciales pollicares. *Alabastra* circiter 4‴ longa. *Capsulæ* breviter vel brevissime pedicellatæ 2½–4‴ longæ vertice convexæ, raro 6-loculatæ. *Semina* fertilia angulato-ovata fusco-nigrita lævia 1‴ breviora.

Arbuscula "Silver-leaved Iron-bark" colonis designata, ex habitu proprio perfacile recognoscenda, sed characteribus floris fructusque sæpe variantibus ægre botanico describenda. Infelicissimus Leichhardt in opere suo (Overland Expedition, &c.) præter normalem etiam alteram speciem huic persimilem sed cortice squalide cano recedentem circum sinum Carpentaria et in Australia boreali-occidentali valde frequentem appellatione supra memorata comprehendit.

E. pruinosæ Schauer (non Turcz.) affinis.

§ 3. *Valvæ omnino inclusæ.*

28. Eucalyptus latifolia. Arborea, ramulis teretiusculis, *foliis* suboppositis sparsisve longiuscule petiolatis *lato- vel orbiculari-ovatis* obtusis glaucescentibus opacis imperforatis tenui-penniveniis, vena longitudinali margini prorsus contigua, umbellis terminalibus paniculatis paucifloris, pedunculis pedicellisque angulosis, illis duplo longioribus, *fructibus subcampanulatis ecostatis* 3–4-loculatis vertice planis, valvis ad marginem attingentibus.

Hab. In planitiebus ripariis ad partes superiores fluvii Roper, 8 Jul. 1856. Anth. æstate.

Arbor minor vel mediocris. *Cortex* post tardum delapsum strati cinerascentis supremi fulvescens lævis. *Folia* 2–3 raro 4″ longa, sæpe 2″ lata, petiolo fere pollicari prædita, crebrius et subtilius quam ea *E. bigaleritæ* pennivenia. *Umbellæ* simpliciter et composite paniculatæ. *Fructus* circiter 3‴ longi, summo margine leniter reflexi. *Valvæ* inclusæ. *Flores* non reperi.

Habitu *E. bigaleritam* simulans, characteribus potius *E. dichromophloiæ* accedens.

29. Eucalyptus aspera. Arborea, *ramulis* teretiusculis *hispidulis, foliis* parvis *oppositis* chartaceis *oblongo-ovatis* obtusis basi cordata *sessilibus* glaucis opacis *scabridis* penniveniis subtus reticulato-venulosis vix pellucide punctatis ad nervum asperis, vena longitudinali a margine remota, umbellis axillaribus sessilibus [brevi-pedunculatis pedunculis hispidis, R. K.] bi-paucifloris, pedicellis [glaberrimis, R. K.] fructu subcampanulato ecostato parum longioribus, valvis inclusis.

Hab. In planitiebus arenoso-rupestribus (Sandstone table-land) plus minus elevatis ad flumina Victoria et Sturt's Creek, in terra Arnheim's Land necnon prope sinum Carpentaria satis vulgaris. Anth. vere.

Arbor minor, cortice lævi cinereo-albido. *Folia* pleraque 1–2″ longa, 8–12‴ lata. *Fructus* fere 3‴ longi.

E. setosæ Schauer affinis.

30. Eucalyptus ferruginea* (*Schauer in Walp. Rep. Syst.* ii. p. 296). Arborea, ramulis validis teretibus foliisque puberulo-scabris glabrescentibus, *foliis* oppositis crassiusculis ovato-oblongis basi cordata subsessilibus repandis *undulatis* obtusis vel acuminatis opacis imperforatis prominenter et *remote penniveniis* obscure reticulato-venulosis, vena peripherica imperfecta a margine remota, ... fructibus magnis globoso-ovatis ecostatis antice contractis et loculatis, capsulis demum a calyce solutis, valvis deltoideis inclusis, *seminibus antice longe alatis.*

Hab. In plagis elevatis rupestribus (Sandstone table-land) non rara per Australiam borealem et boreali-occidentalem. Anth. vere.

Arbor mediocris, cortice ubique persistente rugoso sordide cano. *Folia* utplurimum 3–4″ longa, inferne circiter 1¼″ lata, nervis flavidis percursa et punctis elevatis scabriuscula. *Fructus* circiter 1″ longi, ad ¾″ lati, vertice plani. *Valvæ* solutæ marginem calycis vix attingentes. *Semina* omnia alata; fertilium ala ovata vel deltoidea, sæpe 3‴ longa. *Cotyledones* foliaceæ convolutæ. *Albumen* nullum. *Radicula* brevis cylindracea infera.

Species ad *E. ferrugineam* et *floribundam* appropinquans.

31. Eucalyptus melissiodora (*Lindley in Mitch. Trop. Austr.* p. 235). Arborea, *ramulis* compresso-tetragonis *asperis,* foliis oppositis vel subopposititis ovatis vel subcordatis raro oblongo-lanceolatis *supra basin rotundatam subinflexam petiolatis scabris* opacis translucenti-punctatis penniveniis reticulato-venulosis, vena peripherica a margine inæqualiter remota, umbellis paniculatis 6–7-floris, pedunculis scabris: partialibus calyce longioribus angulatis, alabastris ovatis lævibus ecostatis brevissime pedicellatis, tubo operculum interius conico-hemisphæricum dimidio excedente, *operculo exteriore imperfecto,* fructibus campanulatis trilocularis vertice planis, valvis inclusis, seminibus lævibus apteris.

Hab. In montibus porphyriticis tractus Newcastle Range. Anth. Oct., Nov.

* Sent as *E. undulata*, n. sp., by Dr. Mueller, but evidently the same as Schauer's plant.—(A. B.)

Arbor minor vel mediocris, trunco recto, *cortice undique persistente lamellari fragillimo squalide fulvo nitente*! *Ramuli* cum pedunculis scabritie cinerea et ferruginea obducti. *Folia* petiolo ½–1″ longo semitereti utplurimum supra basin raro ad marginem affixa, normaliter 2–3″ longa, 1½–2½″ lata, in abnormi specimine Mitchellii ad 5″ longa et 1″ tantum lata, nunc acuta, nunc obtusa immo emarginata. *Calycis* tubus nitens obconico-semiovatus 2–3‴ longus, in pedicellum brevissimum attenuatus. *Operculum* duplex, exterius castaneo-fuscum interiori accretum in frustulis tarde secedens; interius 1½‴ longum. *Fructus* circiter 4‴ longi exacte campanulati virentes vertice planiusculi, valvis supra medium tubi insertis. *Semina* brunnea nitentia. Species duplici nota memorabilis.

§ 4. *Species fructu incognito.*

32. Eucalyptus bigalerita. Arborea, ramulis teretiusculis, *foliis* alternis rarius oppositis longe petiolatis *cordatis vel subtrapezoideis* acutiusculis nunc acuminatis vix pellucide punctatis opacis penniveniis, vena peripherica a margine inæqualiter remota, umbellis lateralibus axillaribusque 4–7-floris solitariis, pedunculo crasso verruculoso calycibus parum longiore cum pedicello perbrevi anguloso, calycis tubo semiovato 3–2-costulato operculo triplo longiore, *operculo duplici*: *utroque* obtusissimo *coriaceo* vel externo apiculato, ...

Hab. In pratis fertilioribus sylvaticis tractus australis terræ Arnheim's Land (3–5 Jul. 1856). Anth. Jul.–Sept.

Arbor parva vel mediocris rarius excelsa, gummi-resina pulchre rubiginosa abunde scatens. *Cortex* post strati supremi lævis cinerei lapsum dilute *fulvidus* lævigatus. *Folia* pleraque 3–4″ longa, 2–3″ lata, petiolo inferne teretiusculo superne semitereti 1½–2″ longo prædita, satis saturate viridia. *Calyces* circiter 3‴ longi virides. *Operculum* externum (denique fuscescens) cito secedens bi–tri-costulatum, costis iisdem tubi continuis; operculum internum virens ecostatum. *Fructum* non habui.

33. Eucalyptus confertiflora*. Arborea, *ramulis* teretibus *foliisque scabris*, foliis oppositis ovatis vel ovato-lanceolatis acutis basi subcordata amplexanti sessilibus prominenter penninerviis venosis opacis imperforatis, *umbellis* axillaribus lateralibus et terminalibus *in fasciculum multiflorum confertis*, pedicellis calyces pedunculosque longitudine duplo triplove excedentibus teretibus, calycis tubo obconico exangulato operculi patellaris apiculati lævis longitudinem triplo excedente, fructibus campanulatis.

Hab. A flumine Victoria ad rivum Gilbert in pascuis siccis proveniens. Anth. Oct., Nov.

Arbor mediocris squarrosa. *Corticis* stratum superficiale sordide cinereum ad trunci partem inferiorem persistens rimulosum in frustulis

* Sent by Dr. Mueller under the name of *E. floribunda*, which is preoccupied; the *E. floribunda* of Hügel being evidently quite distinct.—(R. K.)

separabile; pars trunci superior ut rami læves albidi. *Ramuli* etiam juveniles cano-fusci. *Folia* pleraque 2½–4″ longa, 1½–2″ lata, interdum acuminata. *Glandulæ* oleiferæ non conspicuæ. *Pedunculus* primarius solitarius brevis vel brevissimus, in plures secundarios teretiusculos inæquales solutus. *Pedicelli* graciles ½–1″ longi. *Calycis* virentis tubus 3–4‴ longus. *Operculum* nitens tubo paulo angustius.

E. ferrugineæ Schauer nimis videtur propinqua.

IV. *Folia opposita, latitudine conspicue longiora.*

34. Eucalyptus tetrodonta. Arborea, ramulis angulatis, *foliis oppositis falcato-lanceolatis* sensim acuminatis modice petiolatis opacis indistincte penniveniis imperforatis, vena peripherica margini subcontigua, umbellis axillaribus terminalibusque solitariis bibracteatis trifloris, *bracteis tarde secedentibus majusculis*, pedunculo petiolum æquante angulato, *calyce* subcampanulato *quadridentato* sensim in pedicellum compressum tubo vix æquilongum attenuato dentibus deltoideis operculo hemisphærico et tubo fere duplo brevioribus patulis, ...

Hab. In plagis elevatis nemorosis minus fertilibus terræ Arnheim's Land passim. (Ad Portum Essington, *Armstrong*; et in ora boreali, *A. Cunningham*, in hb. Hook.) Anth. Aug., Sept.

Arbor mediocris, trunco gracili recto, cortice sordide cano fibroso ubique persistente. *Cortice* arborum "Stringy-bark-trees" dictarum prædita. *Ramuli* rufescentes rigiduli. *Folia* 3–6″ longa, ½–1½″ lata. *Pedunculi* 3–4‴ longi apice bracteas 2 cymbiformi-lanceolatas obtuse acuminatas circiter 3‴ longas deciduas gerentes. *Calycis* tubus additis dentibus 4–5‴ longus. *Operculum* coriaceum obtusum opacum viridulum.

Species calyce dentato quam maxime insignis, transitum ad Angophoras præbens.

V. *Sectio dubia.*

35. Eucalyptus brachyandra. Arborescens, ramulis angulatis, foliis alternis v. oppositis modice petiolatis chartaceis ovatis vel late oblongis obtusis opacis tenuiter penniveniis subtiliter venulosis imperforatis subtus pallidioribus, vena peripherica margini subcontigua, umbellis 3–5-floris in paniculam terminalem concretis, pedunculis angulatis, pedicellis tenuibus calyce brevioribus vel eidem æquilongis, operculo conico-hemisphærico tubo breviore, *filamentis perbrevibus, antheris didymis, fructibus minutis campanulatis* exangulatis ecostatis 3–4-loculatis vertice concavis, valvis subinclusis brevissimis, seminibus apteris.

Hab. In decliviis rupestribus ad partes fluvii Victoriæ superiores. Anth. primo vere.

Frutex arborescens. *Folia* utplurimum 1½–3″ longa, ¾–1½″ lata obtusa ima basi acutiuscula. *Calyx* florifer 1‴ paulo excedens, fructifer sesquilinearis v. paulo longior. *Stamina* ad summum 1‴ longa! *Operculum* tantum in alabastris juvenilibus visum.

Species minutie florum et fructuum valde insignis.

36. Eucalyptus (E. clavigera, *A. Cunn. in hb. Hook.*) polysciada, *F. Muell.* sp. Arborea, ramulis validis teretibus junioribus angulatis, foliis alternis v. suboppositis breviuscule petiolatis ovatis v. lanceolatis acuminatis tenui-coriaceis imperforatis margine undulatis opacis glaucescentibus prominenter penniveniis et reticulato-venulosis, vena peripherica a margine inæqualiter remota, *umbellis* paucifloris v. frequentius *multifloris* inæqualiter pedunculatis partim divisis v. compositis *secus ramulos paniculam ditissimam aphyllam construentibus, pedicellis tenuibus angulatis calyce ter quaterve longioribus*, alabastris pyriformibus, calycis tubo obconico apice leviter ampliato ecostato exangulato operculum patellare nitens muticum longitudine aliquoties excedente, fructibus truncato-ovatis sublævibus, ...

Hab. In collibus apricis lapidosis et planitiebus aridis prope M'Adam Range. Anth. vere.

Arbor minor, cortice (si recte in memoria retento) lævi cinereo. *Folia* latitudine variabilia basi sæpe in petiolum decurrentia, plerumque 3–4" longa, $\frac{3}{4}$–2" lata. *Pedunculi* sæpe pedicellis breviores magis minusve compressi. *Pedicelli* $\frac{1}{2}$–1" longi. *Calyx* addito operculo $2\frac{1}{2}$–3‴ longus. *Operculum* læve interdum paulo apiculatum. *Stamina* albida ad summum vix 3‴ longa. *Antheræ* ovato-oblongæ. *Fructus* 4‴ longus.

E. clavigeræ affinis.

37. Eucalyptus odontocarpa. Fruticosa, ramulis angulatis, *foliis oppositis* breviuscule petiolatis *lineari-* v. angusto-*lanceolatis* subfalcatis basi acutatis nitidulis pellucide punctatis penniveniis et reticulato-venulosis, vena peripherica a margine paulo remota, umbellis axillaribus subtrifloris breviter pedunculatis, *calycis* brevissime pedicellati *tubo* obconico acute *quadridentato* operculi depresso-hemisphærici longitudinem triplo excedente, fructibus ovato-obconicis indistincte costatis quadridentatis triloculatis, valvis infra marginem insertis inclusis.

Hab. In deserto arenoso ad rivum Sturt's Creek. Anth. autumno.

Frutex 8–10′. *Rami* sat tenues. *Folia* 2–5" longa, 3–6‴ lata. *Umbellæ* interdum geminæ, altera depauperata. *Fructus* 3–4‴ longi nitentes.

38. Eucalyptus pachyphylla*. Fruticosa, ramulis juvenilibus angulatis, *foliis* alternis modice petiolatis crasso-coriaceis *ovatis* v. lanceolato-ovatis acuminatis vix inæquilateris imperforatis tenuissime penniveniis, vena peripherica a margine remota, umbellis axillaribus subtrifloris, pedunculis pedicellisque brevissimis, ... , *tubo calycis fructiferi depresso-hemisphærico quadricostato* et obsolete

* Not *E. pachyphylla*, Cunn. MSS., from King George's Sound (No. 231 of 4th Voyage).

costulato, *margine* elevato, capsulæ 4–5-loculatæ vertice convexo, valvis subexsertis, seminibus fertilibus angusto-alatis sublævibus.

Hab. In eremo arenoso ad Hooker's Creek. Anth. autumno.

Frutex orgyalis v. paulo altior. *Folia* pleraque 1½–2½″ longa in speciminibus siccis opaca. *Flores* incogniti. *Fructus* diametro 6–8‴, margine demum supra valvas producto. *Semina* fertilia alis additis circiter 1½‴ longa.

E. alpinæ propinqua.

Tentamen dispositionis Eucalyptorum Australiæ intratropicæ et subtropicæ, secundum corticis structuram, texturam, et separationem, usui Colonorum accommodatum.

I. Leiophloiæ. Cortex post delapsum strati supremi undique lævis. (Vulgo: Flooded Gum-trees, White Gum-trees, Blue Gum-trees partim, Red Gum-trees partim, Yarra-trees.)

II. Hemiphloiæ. Cortex in trunci parte inferiore persistens rugosus et rimosus, in parte superiore ramisque delapsu strati superioris lævigatus. (Vulgo: Moreton Bay Ash, Black-butted Gum-tree, Box-trees partim.)

III. Rhytiphloiæ. Cortex ubique persistens rugosus et rimosus intus solidus. (Vulgo: Bloodwood-trees, Box-trees partim, Peppermint-trees partim.)

IV. Pachyphloiæ. Cortex ubique persistens rugosus intus fibrosus. (Vulgo: Stringy-bark-trees.)

V. Schizophloiæ. Cortex ubique persistens profunde sulcatus intus solidus. (Vulgo: Ironbark-trees.)

VI. Lepidophloiæ. Cortex saltem in trunco persistens lamellaris friabilis. (Vulgo: Melaleuca Gum-trees, Mica-trees.)

I. Leiophloiæ.

§ 1. *Folia alterna subfalcata concoloria.*

1. *E. tereticornis*, Sm. (1.) Operculum elongatum conico-subulatum curvatum. Valvæ alte exsertæ.

2. *E. rostrata*, Schlecht. (2.) Operculum subulato-acuminatum rectum. Valvæ alte exsertæ.

3. *E. signata*. (6.) Operculum hemisphæricum. Valvæ vix exsertæ. Fructus semiglobosi.

4. *E. variegata*. (13.) Operculum hemisphæricum. Valvæ inclusæ. Fructus semiovati.

5. *E. citriodora*, Hook. (23.) Operculum hemisphæricum ? Valvæ . . . . Odor foliorum citreus.

6. *E. brevifolia.* (3.) Operculum hemisphæricum. Valvæ exsertæ.

7. *E. dichromophloia.* (17.) Operculum semiovatum. Valvæ inclusæ. Semina alata.

§ 2. *Folia alterna subfalcata discoloria.*

8. *E. hemilampra.* (7.) Operculum elongato-conicum rectum. Valvæ semiexsertæ.

§ 3. *Folia alterna et opposita ovata vel orbiculata.*

9. *E. bigalerita.* (32.) Operculum duplex. Valvæ . . . .

10. *E. latifolia.* (28.) Operculum . . . . . . Valvæ inclusæ.

11. *E. platyphylla.* (26.) Operculum hemisphæricum. Valvæ exsertæ.

§ 4. *Folia opposita subovata.*

12. *E. aspera.* (29.) Operculum . . . . Valvæ inclusæ.

II. Hemiphloiæ.

§ 1. *Folia alterna subfalcata.*

13. *E. tessellaris.* (14.) Operculum patellare. Valvæ inclusæ.

14. *E. semicorticata.* (8.) Operculum acuminatum. Valvæ subexsertæ.

§ 2. *Folia opposita cordato-ovata.*

15. *E. confertiflora.* (33.) Operculum patellare. Valvæ . . . .

III. Rhytiphloiæ.

§ 1. *Folia alterna subfalcata.*

16. *E. polycarpa.* (15.) Operculum . . . . Valvæ profunde inclusæ. Paniculæ multifloræ. Semina alata.

17. *E. terminalis.* (16.) Operculum . . . . . . Valvæ breviter inclusæ. Paniculæ multifloræ. Semina alata.

18. *E. tectifica.* (24.) Operculum conicum acuminatum. Valvæ . . . . .

19. *E. leptophleba.* (9.) Operculum . . . . Valvæ subinclusæ. Rami undique corticati.

20. *E. microtheca.* (10.) Operculum . . . . Valvæ subinclusæ. Rami apice decorticati.

21. *E. patellaris.* (4.) Operculum patellare umbonatum. Valvæ exsertæ.

22. *E. trachyphloia.* (18.) Operculum . . . . Valvæ profunde inclusæ. Semina aptera.

23. *E. bicolor*, A. C. (19.) Operculum hemisphæricum. Valvæ inclusæ. Semina aptera.

§ 2. *Folia alterna rotundata.*

24. *E. populnea.* (25.) Operculum hemisphæricum. Valvæ inclusæ.

§ 3. *Folia opposita cordato-ovata.*

25. *E. ferruginea*, Schauer. (30.) Operculum . . . . . . Valvæ inclusæ. Semina alata.

IV. Pachyphloiæ.

§ 1. *Folia alterna subfalcata.*

26. *E. fibrosa.* (11.) Operculum conicum. Valvæ breviter exsertæ.

27. *E. exserta.* (5.) Operculum conicum. Valvæ alte exsertæ.

28. *E. ptychocarpa.* (20.) Operculum hemisphæricum costatum. Valvæ profunde inclusæ.

§ 2. *Folia opposita subfalcata.*

29. *E. tetrodonta.* (34.) Operculum hemisphæricum. Tubus quadridentatus. Valvæ . . . .

V. Schizophloiæ.

§ 1. *Folia alterna subfalcata.*

30. *E. crebra.* (12.) Operculum semiovatum. Valvæ breviter exsertæ.

§ 2. *Folia opposita cordato-ovata.*

31. *E. melanophloia.* (27.) Operculum late conicum. Valvæ breviter exsertæ.

VI. Lepidophloiæ.

§ 1. *Folia alterna subfalcata.*

32. *E. aurantiaca.* (21.) Operculum semiglobosum costatum. Valvæ inclusæ. Fructus sessiles.

33. *E. phœnicea.* (22.) Operculum . . . . . . Valvæ profunde inclusæ. Fructus pedicellati.

§ 2. *Folia opposita cordato-ovata.*

34. *E. melissiodora*, Lindl. (31.) Operculum conico-hemisphæricum subduplex. Valvæ inclusæ.

VII. Sectio dubia.

35. *E. brachyandra.*
36. *E. clavigera*, A. C.
37. *E. odontocarpa.*
38. *E. pachyphylla.*

On some Tuberiform Vegetable Productions from China.

By the Rev. M. J. Berkeley, M.A., F.L.S.

[Read April 15th, 1858.]

Some months since I received, by the kindness of Professor Horaninow, two tuberiform productions from China, of which one was nearly allied to *Mylitta australis*, Berk., and the other, marked *Pachyma Coniferarum*, Horaninow, was evidently identical with the Tuckahoe or Indian Bread of the United States, *Pachyma Cocos*, Fries.

At a later period, specimens of a drug, known in China under the name of Pe-foo-ling, were shown by Mr. Daniel Hanbury to Mr. Kippist, who at once pointed out their identity with *Lycoperdon solidum* of the 'Flora Virginica,' *Pachyma Cocos*, Fries.

The subject was brought to my especial notice by Dr. Hooker; and having ascertained the identity of the productions of Mr. Hanbury and Prof. Horaninow, I thought that a short note on it might possibly be acceptable to the Society; and the more so, as Mr. Hanbury has a second production very nearly allied, while I am in possession of a third very distinct though allied substance, through Prof. Horaninow.

The best introduction to my note will be an extract from a letter received by me from Mr. Hanbury:—

"There are *two* Chinese esculent *Fungi*, which I think are worthy of notice. My attention was first drawn to them while examining some specimens of Chinese Materia Medica, by stumbling on the following passage in Loureiro's 'Flora Cochinchinensis' (ed. Willd. 1793, p. 710):—

"'Ad radices Pinorum sylvestrium magnæ longævitatis in provincia boreali Chinensi *Su chuyen* gigni solent quædam tubera, subrotunda, magna, scabra, fusca, intus albissima, quæ ab Europæis vocantur *Radix Sinensis alba*, a Cochinchinensibus *Bach phuc linh*, ab ipsis vero Sinensibus *Pĕ fú lîn*. Horum tuberum decocto feliciter utuntur in praxi medica, præcipue in morbis pulmonum et vesicæ.

"'Radix Sinensis rubra provenit ex diversa planta, quæ a Linnæo dicitur *Smilax China*.'

"Nor was my curiosity diminished by finding in Endlicher's 'Enchiridion Botanicum' (p. 144) the following allusion to the same subject:—

"'In annosis *Pinus Massonianæ* Lamb. radicibus apud Sinas gigni solent tubera (vulgo *Pe-fu-lin*, Radix Sinensis alba) magna,

subrotunda, extus scabra, fusca, intus albida, insipida, tactu ceracea, quorum decocto in morbis pulmonum et vesicæ utuntur.'

"I therefore wrote to my brother Thomas Hanbury of Shanghai, who obtained for me not only the substance called *Pe-foo-ling*, but a second, known as *Choo-ling*, together with some cakes said to be made from one or both of them. These cakes, or an imitation of them, are commonly sold in the streets of Shanghai; and the cry of the itinerant vendors—*Ā Hoo Ka Foo-ling Ka!*—is one of the first of the many strange sounds to salute the ear of the newly-arrived foreigner.

"With respect to the *Foo-ling* itself, my first impression was to regard it as the rhizome of some species of *Smilax*, allied to *S. China*, L., the source of the drug known as *China Root*. Such was the opinion of the older writers, as Martini, who, in his 'Novus Atlas Sinensis' (1655), describes it as being the *true* China Root. Cleyer also, in his 'Specimen Medicinæ Sinicæ' (1682), says of it*, 'Est idem quod Lusitanice dicitur Pao de China, nisi quod album et multo melius sit rubeo illo, et etiam carius multo.'

"I had soon, however, to alter my opinion on testing a decoction of the *Foo-ling* with iodine and finding it to contain no starch, the abundant presence of that body being a marked character of the Smilax rhizome. I found also, upon turning to the 'Herbarium Amboinense' (xi. 123), where Rumphius describes it as *Hoelen*, that its distinctness from China Root had been there noticed. Mr. Kippist, however, soon settled the question, by pointing out to me in the 'Linnean Transactions†' a paper by Dr. James Macbride, of South Carolina, entitled "Some account of the *Lycoperdon solidum* of the Flora Virginica," read before the Society 3rd June, 1817; and at the same time laying before me a fine series of specimens of *Lycoperdon solidum*, with which plant it was evident the Chinese *Pe-foo-ling* was, if not identical, at least very nearly related.

"Of the *Choo-ling*, I have nothing to tell you, except that, in common with the *Pe-foo-ling*, it is described and figured in the great Chinese Herbal, the *Pun-tsaou*."

Mr. Hanbury has, in addition to these remarks, furnished me with a translation of that portion of the 'Pun-tsaou' which relates to these productions, which I have the pleasure of now laying before the Society‡.

* *Medicamenta simplicia*, No. 189. † Vol. xii. p. 368.

‡ *Fuh-ling* and *Choo-ling*.—Abstract of the account given in the great

A microscopical examination of the several specimens of Foo-ling from Messrs. Horaninow and Hanbury, and a comparison with a fine series from South Carolina, sent to me by Mr. Curtis,

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Chinese Herbal, 'Pun-tsaou-kang-muh,' Chap. 37. sect. 4. (Translated by the Rev. W. C. Milne.)

茯苓 *Fuh-ling*: synonyms 伏菟 *Fuh-too*, — *too* being a name given to it because it is found on the same tree as the *Too-sze*, another medicinal plant; or rather, as some say, because it resembles a small hare.

松腴 *Sung-yu*, a name derived from its connexion with the pine-tree.

不死麪 *Puh-sze-mien*, literally *Undying-flower*.

伏神 *Fuh-shin*, which name is restricted to a species to be found clinging to the root of the pine. Such, it is presumed, contains the finest essence of the pine. One of the fairy tales says, that there are pieces of this species to be found as big as a man's fist, one of which, if you sling it as an amulet round your person, will discomfit a hundred devils, in full proof of its divine origin.

In describing the Fuh-ling, one author observes that both it and the species called Fuh-shin grow under the large pines on the heights and valleys of lofty mountains, and that they may be gathered in the second and eighth moons [*i. e.* during spring and autumn].

Another writer remarks, that samples come from Yuh-chow as large as a vessel with a capacity of three or four shings [pints]. The outer skin is black, with small wrinkles on it; underneath it is fine and white. It appearance is that of a small tortoise; and that with a reddish tinge is not unlike a frog after being imbedded underground for thirty years.

A third writer notes that Fuh-ling is produced in the Tai-shan mountains of the province of Shantung, but that the best kind is decidedly that of the Hwa-shan hills of Shen-se.

According to the testimony of a fourth writer, wherever large pines flourish you have the Fuh-ling; but as at Hwa-shan there stands an immense number of old firs, you have there excellent specimens.

A fifth observer remarks, that pines of 1000 years old are sure to have the Fuh-ling; but a sixth observes, that after the resin of the pine has fallen on the ground and remained there 1000 years, it is changed into Fuh-ling. When you see the pine-tree turn red, you have the Fuh-ling. Fuh-shin is a product of the pine superior to the Fuh-ling.

At present all the hills of the Hwa-shan range produce it. It clings to the under-roots of the pine-trees, and grows leafless and flowerless, as large as a man's fist. Sometimes underground you meet with it so big as to be several catties* in weight. There are two varieties, red and white. Some say it is the gum of the fir-tree metamorphosed; and others, that it is the excrescence of the spurious pine-tree. But down to the present day there are people who constantly meet with the Fuh-ling under masses of very old pines which have long been cut down, and whose trunks, branches, and twigs lie about rotten and decaying.

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* The catty equals $1\frac{1}{3}$ lb.

as also with a portion of an authentic specimen of Schweinitz, show that they are all identical. The structure varies a little with age, and in Horaninow's specimens there are abundant very

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To procure it, a plot of ground is cleared and probed with an iron barbed instrument. Should any Fuh-ling be there, it will be impossible to pull out the instrument again, except by digging about it.

[Under this heading some legends are given, which it is needless to translate, as they would be unintelligible, and (as the author hints regarding one) are treated with little faith.]

Five forms of Fuh-ling are mentioned as of medicinal use, viz.:—

1. Ordinary Fuh-ling.
2. Red Fuh-ling.
3. Fuh-ling bark.
4. Fuh-shin.
5. Shin-muh or Hwang-shin-tsoh, a rare species found in the heart of the Fuh-shin: one of its names signifies *Yellow-fir-knot.*

In the preparation of this medicinal plant, whoever uses the bark must put away the heart of the Fuh-ling, then pound the bark small in a basin of water, take off the scum and filter the water. An erroneous application of this may prove hurtful to the eye. To make it into powders or pills, let it be boiled thoroughly two or three times, and then dried.

Its taste and smell are agreeable, and not poisonous.

The class of diseases for which it is used are, to sum them up generally, pains in the chest, severe ague, great debility, depression of spirits, stoppage of urine, want of sleep, excess of phlegm, dropsy, affections of the kidneys, violent retching, rheumatism, infantile convulsions, fatigue in body and mind, dysentery, disease in the groin, and female complaints.

豬苓 *Choo-ling*, derives its name, first, from its resemblance in colour to the fæces of the pig (*Choo*); and secondly, from its being found lying here and there as droppings from the tree upon which it is parasitic. Its other names indicate the same, viz.

豭豬屎 *Kia-choo-she*, literally *Hog's-dung.*

豕橐 *She-tŏh*, literally *Pig's-entrails?*

地烏桃 *Te-woo-taou*, literally *Earth-walnuts.*

The following is an abridged summary of the opinions of various Chinese observers relative to the Choo-ling.

It is found principally on the heights and valleys of Hang-shan*, as also in Shuh-chow and Seih-chow.

It is picked up in spring and autumn. It is a parasite on the Fung-shoo tree [*Acaciæ* sp.?], though also found upon other trees. It much resembles the Fuh-ling.

The skin of the Choo-ling is black, but the flesh is white and firm. It can be used only after scraping off this skin. In preparing it for medicinal pur-

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* [Either in the province of Kiang-nan, or in that of Hoo-nan.]

delicate threads which traverse the mass in every direction; but the nature of the bodies of which the greater part of the substance is composed, their form, and chemical characters are precisely the same, and there can be no doubt that they all belong to one and the same category.

This matter consists of irregular bodies, varying very greatly in size, often globular, but frequently forming broad bands with transverse markings and clefts, exhibiting no trace of starch under iodine, and without the slightest appearance of an investing membrane. This substance has been submitted to chemical investigation by Professor Ellett of South Carolina College, and has been ascertained to consist entirely of pure pectine of Braconnot. It is quite insoluble in water, though it dissolves in alkaline solutions, forming neutral pectates, whence the pectic acid is separated, by the addition of muriatic acid, in the form of a colourless jelly. By a particular management, with the details of which I am not acquainted, this jelly may be prepared so as to form an agreeable article for the dessert*.

It is not surprising, therefore, that it is manufactured in China into a popular and nutritious food. It is probable that the cakes which are made of it are regarded as medicinal as well as economical; and it is curious that Prof. Ellett remarks that the nutritious jelly formed from the Tuckahoe is an excellent antidote against several of the most powerful mineral poisons.

The structure of the Choo-ling is somewhat different from that of the Foo-ling. The several parts are far smaller in their dimensions, and there are none of the streaked and incised bands. The greater part of the mass consists of short, sometimes forked, and

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poses, scrape off the coarse skin with a copper knife, cut the Choo-ling into thin slices, and steep them in Tung-lew† water for a whole night; drain off the water thoroughly; pack the slices in a bundle of Shing-ma‡ leaves for a day, and, on removing the wrapper, they will be quite dry and fit for use. The smell and taste of the Choo-ling are mild, sweet, and not poisonous—something like the Fuh-ling.

The diseases for which it is generally used are, severe ague, severe dropsy, long-suppressed urine, debility and age, abdominal swellings attended with violent pains, depression of spirits, diseases in the groin, dysentery, and some affections peculiar to females in pregnancy.

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* See "Observations on Tuckahoe," in Gardener's Chronicle, 1848, p. 829.

† [If Tung-lew is the name of a place, it is in the department of Che-chow, province of Ngan-hwuy.]

‡ *Shing-ma*, literally the *Ascending Hemp*: it is described in the 'Pun-tsaou,' chap. 13. fol. 29.

sometimes torulose linear bodies, varying, however, much in outline; and dispersed among them are a number of small granules, many of which contain a minute nucleus; while other larger bodies, exhibiting one or two faint traces of concentric circles, are scattered about, exactly like the asci of a truffle, but containing only a very small irregular nucleus. Treated with the same chemical tests as the Foo-ling, it exhibits precisely the same reaction. There is not the slightest trace of starch or cellulose, and it is evident that the structure is not accordant with that of any Fungus or phænogamous Tuber.

As there is some outward resemblance between this production and the tuberiform body which precedes the growth of *Peziza tuberosa*, I have made a comparative examination of the two, and though there is some resemblance as regards chemical reaction, the structure is totally different. In the *Peziza* tuber the whole mass consists of large threads with very thick gelatinous walls, and an abundant proteinous endochrome.

No fungus has ever been found on the American or Chinese tubers, and, unfortunately, *Pachyma tuber regium*, which gives rise to a species of *Lentinus*, as figured by Rumphius, is quite unknown. It is probably, however, of the same nature with the Pietra funghaja or Fungus-stone of Italy (a mere mass of earth and mycelium), which produces the edible *Polyporus tuberaster* even in our own hothouses.

Unfortunately but little light is thrown upon the real nature of these productions by all the specimens and information we possess. Dr. Macbride asserts that the Tuckahoe originates between the wood and bark of *living* roots; that it gradually detaches the bark, while it spreads round the wood and converts it into a substance similar to itself; and that if it comes in contact with the root of another tree, that root is also assimilated with it. Specimens, however, are wanting to show this transitional state.

I have still to notice briefly the third production sent to me by Prof. Horaninow, of which I forward a portion for your inspection. It is evidently closely allied to the native bread of Australia, but differs in the reddish, not black, cuticle, which does not crack and peel off, the total absence of an intermediate stratum between the cuticle and central mass, and the want of large clavate cells amongst the linear bodies of which the central mass is composed. The internal substance is marbled like a truffle; but there is not a trace of fruit, and in consequence, together with *Mylitta australis*, it must be considered of very doubtful affinity.

Notes on *Abuta*, a genus of *Menispermeæ*. By N. Grisebach, Professor of Botany in the University of Göttingen. Communicated by Dr. J. D. Hooker, F.L.S.

[Read March 18th, 1858.]

The *Menispermeæ* of tropical America, though less numerous than those of the East Indies, are in a state of some confusion; and when I studied the West Indian forms for my intended Flora of those islands, Aublet's *Abuta* seemed to require a particular investigation. Miers had reduced correctly to *Abuta* Persoon's genus *Trichoa* (*Batschia*, Thunb.), but at the same time he excluded *Abuta concolor*, Poepp., which Endlicher before him had referred to *Trichoa*. From this South American species, and from the West Indian *Cocculus domingensis*, which, together with some other forms, he considered congeners, Miers constructed his new genus *Anelasma* (Ann. Nat. Hist. 2nd ser. vii. p. 37 *seq.*). The result of my inquiries is, however, at variance with his views, and the object of these remarks is to prove that *Abuta* is a distinct genus of *Cocculeæ*, comprising Aublet's and Poeppig's species, and that *Cocculus domingensis* does not belong to the same. The character of *Abuta*, which, as Miers has well suggested, approaches most to the East Indian genus *Tiliacora* (distinct by a greater number of carpels), is the following:—

Abuta, Aubl. Char. gen. *Sepals* 6, biserial, the interior larger. *Petals* 0. ♂: *Stamens* 6. ♀: *Ovaries* 3; styles cylindrical, uncinate. *Drupes* large, ovoid: the cavity divided by a thin vertical plate of the endocarp, penetrating from the base to the arch of the seed. *Seed* completely inflexed, with the inner sides flat and accumbent to the plate: *endosperm* thick, ruminated, and separated by numerous horizontal incisures penetrating almost to the middle: *embryo* inflexed-cylindrical, almost equalling in length the endosperm, and included by its central channel.—Woody vines; leaves *leathery, entire, with the petiole thickened at the top;* flowers *small, arranged in axillary racemose panicles.*

The materials upon which this character has been constructed are: 1st, flowers of both sexes and fruit of *A. rufescens*, Aubl., from the Rio Negro, in the Brazilian Collection of Spruce (♂, *Abuta*, no. 2; ♀, no. 2340; fruit, no. 2303); 2nd, male flowers and fruit from the same (♂, no. 2829; fruit, no. 2102).

The genus is distinct from *Cocculus* chiefly by its ovoid (not compressed) drupes, by its ruminated endosperm, and by wanting petals: but its character, as given by different authors, was either

incomplete or erroneous. Thus, if we compare our specimens with the analysis of *A. concolor*, as represented by Poeppig (Nov. Gen. t. 190), his 3 petals do not exist, the monadelphy is only a slight adherence of the stamens at the base itself, and his embryo (figured erroneously on the inner side of the endosperm, and bearing foliaceous cotyledons) is merely a thickening of the endocarpic dissepiment, the real embryo having been overlooked in the interior channel of the endosperm. Miers, on the other hand, of whom I have compared such materials as exist in Sir W. Hooker's and Bentham's herbaria, was mistaken, in consequence of the incompleteness of the specimens, in his character of *Anelasma*, which he describes as apetalous, and presenting an exalbuminose embryo with large thick cotyledons,—though Poeppig, with respect to *A. concolor*, had given a nearly correct idea of the large ruminated albumen, formed exactly in the same way as in *A. rufescens*, and though *Cocculus domingensis*, the second species of his genus *Anelasma*, exhibits 6 petals in its male flower. A seed of the latter, which had been examined by Miers, I found not impregnated, and in consequence the drupe filled only partially by a dead tissue, taken possibly for an exalbuminose embryo.

Abuta rufescens, Aubl., is characterized by ovate, pointed, five-nerved leaves, velvety on their under side, and by the inflorescence and the ovaries downy. Its apparent synonyms are *Batschia racemosa* and *conferta*, Thunb. (Nov. Act. Ups. v. t. 2. f. 1, 2,—a tolerable representation of the genus), both forms from New Granada,—the range of the species comprising the whole of equatorial America from that country to the Amazons and Guiana.

A. concolor, Poepp., approaching in habit to *Cocculus domingensis*, is distinguished by elliptical polished leaves, the primary veins of which are separate at the base itself, and the tertiary veinlets not prominent. Its synonyms are, *Anelasma Spruceanum*, Miers !, *A. guianense*, Miers !, and probably *Cocculus lævigatus*, Mart. Its geographical range comprises a still larger area, viz. equatorial Brazil !, Goyaz (Gardn. no. 3567 !), Cayenne (Martin).

Notes on Arctic Plants. By E. Dickie, Esq., M.D., A.L.S., Professor of Natural History, Queen's College, Belfast.

[Read April 15th, 1858.]

Dr. J. D. Hooker, in April 1856, communicated to the Linnean Society "Remarks on some Collections of Arctic Plants." It being desirable that as many facts as possible should be placed on

record respecting the vegetation of the North Polar circle, I have thought it right to put together notes on small collections made at various periods by some of my former pupils, while in medical charge of whaling vessels.

The specimens were contributed by Messrs. W. F. Clarke, A. K. Clark, Maitland, Philips, Craig, and Sutherland.

The localities extend on the east side of Davis's Straits, from lat. 69½° N. to 76° N.; and on the west side from 65° N. to 74° N.

One of these gentlemen, Dr. P. C. Sutherland, now of Port Natal, made good collections when attached to Penny's and Inglefield's expeditions; records of these are appended to the published accounts of these voyages.

Ranunculus nivalis, *L.*	Cape Lawson; Black Hook.
R. hyperboreus, *Rottb.*	Operniwick (full flower July 15); Durban Harbour.
Papaver nudicaule, *L.*	Operniwick (full flower July 15); Cape Lawson (full flower June 22); Duck Islands; North Foreland; Exeter Bay; Durban Harbour.
Draba alpina, *Wahl.*	Black Hook (full flower June 14); Pond's Bay.
D. rupestris, *R. Br.*	Cape Lawson (full flower June 22); Frau Islands (full flower July 15); Cape Searle; Durban Harbour.
Cardamine bellidifolia, *L.*	Frau Islands (flower July 15).
Vesicaria arctica, *Richards.*	Black Hook (flower July 27).
Platypetalum purpurascens, *R. Br.*	Black Hook, sea-level to 500 feet.
Cochlearia fenestrata, *R. Br.*	Cape Searle.
C. anglica, *D.C.*	Cape Dudley Digges; Durban.
Silene acaulis, *L.*	Operniwick (flower July 15); Black Hook; Exeter Bay.
Lychnis apetala, *L.*	Operniwick (flower July 15); Cape Searle; Durban.
Stellaria longipes, *Goldie*	Durban.
Arenaria rubella, *Hook.*	Exeter Bay; Durban.
A. Rossii, *R. Br.*	Operniwick.
Honckeneya peploides, *Ehrh.*	Operniwick; Rugged Rock.
Cerastium alpinum, *L.*	Black Hook; North Foreland; Exeter Bay; Cape Searle (flower August 23); Durban; Cumberland Inlet.
Oxytropis campestris, *D.C.*	Pond's Bay (flower July 27).
Astragalus alpinu *L.*	Pond's Bay (flower July 27).

Dryas octopetala, *L.*	Cape Searle.
D. integrifolia, *Vahl*	Cape Lawson (flower June 22); Cape Dudley Digges; Cape Searle.
Potentilla nivea, *L.*	Cape Lawson (flower June 22); Black Hook (flower June 24); Duck Islands; Cape Searle; Pond's Bay; Durban.
Epilobium latifolium, *L.*	Cape Searle (flower August 23); Cape Dudley Digges, sea-level to 500 feet; Durban.
Saxifraga tricuspidata, *Retz*	Cape Searle (flower August 21); Cape Dudley Digges.
S. nivalis, *L.*	Operniwick; Cape Searle (flower August 21); Black Hook; Durban.
S. cæspitosa, *L.*	Pond's Bay; Operniwick; Waigat Strait; Cape Searle (August 21 in flower).
S. cernua, *L.*	Pond's Bay; Operniwick; Cape Searle (in flower August 23); Durban.
S. rivularis, *L.*	Mollymoak Head.
S. rivularis, var. hyperborea	Black Hook, three miles inland.
S. oppositifolia, *L.*	Cape Lawson (flower June 22); Exeter Bay; Waigat Strait.
Galium pusillum, *L.*	Cape Dudley Digges.
Gnaphalium supinum, *L.*	Durban (September 1, in flower); Cumberland Inlet.
Arnica montana, *L.*	Frau Islands; Cape Searle; Durban.
Erigeron uniflorum, *L.*	Cape Searle.
Campanula linifolia, *A. D.C.*	Cape Searle (flower August 21); Durban.
Vaccinium uliginosum, *L.*	Operniwick; Durban (flower Sept. 1).
Azalea procumbens, *L.*	Operniwick; Duck Islands; Durban (flower July 13).
Pyrola rotundifolia, *L.*	Cape Dudley Digges; Durban, sea-level to 200 feet (flower September 1).
Cassiopea tetragona, *Don*	Operniwick; Exeter Bay; Black Hook, sea-level to 500 feet.
Ledum palustre, *L.*	Durban; Cumberland Inlet.
Phyllodoce taxifolia, *Don*	Durban (flower August 21).
Rhododendron Lapponicum, *L.*	Cape Lawson (flower June 22); Durban (flower September 1).
Arctostaphylos alpina, *Sprengel*	Exeter Bay; Durban.

Menyanthes trifoliata, *L.*	Exeter Bay.
Armeria maritima, *Willd.*	Cape Searle.
Diapensia Lapponica, *L.*	Frau Islands.
Mertensia maritima, *Don*	E. side of Searle Roads.
Pedicularis hirsuta, *L.*	Cape Lawson (flower June 22); Operniwick (flower July 6); Black Hook (flower July 12).
Empetrum nigrum, *L.*	Operniwick, sea-level to 800 feet (flower July 15).
Polygonum viviparum, *L.*	Cape Searle; Operniwick; Durban.
Oxyria reniformis, *Hill*	Operniwick, sea-level to 400 feet (flower July 15).
Salix arctica, *R. Br.*	Operniwick; Four Island Point; Exeter Bay; North Foreland; Durban.
S. herbacea, *L.*	Operniwick (flower July 15).
Tofieldia borealis, *Wahl.*	Durban; Operniwick.
Juncus biglumis, *L.*	Durban.
Luzula campestris, *R. Br.*	Operniwick; Frau Islands; North Foreland; Cape Lawson; Cape Searle.
L. hyperborea, *R. Br.*	Durban; Cumberland Inlet.
Festuca brevifolia, *R. Br.*	Durban Harbour.
Poa abbreviata, *R. Br.*	Durban Harbour.
P. cæsia, *Sm.*	North Foreland.
P. arctica, *Hook.?*	Operniwick, sea-level to 1000 feet.
Phippsia algida, *R. Br.*	Cape Dudley Digges; Cumberland Inlet.
Hierochloe pauciflora, *R. Br.*	Cape Searle.
Alopecurus alpinus, *Sm.*	Cape Lawson; Cape Searle; Black Hook; Cumberland Inlet.
Trisetum subspicatum, *Beauv.*	Cape Searle; Durban.
Eriophorum vaginatum, *L.*	Black Hook; Operniwick.
E. polystachyum, *L.*	Black Hook; Durban.
Carex nardina, *Fries*	Cape Searle; Waigat; Operniwick; Durban.
C. rupestris, *All.*, No. 2.	Cape Lawson.
C. glareosa, *Wahl.*	Waigat Strait; Durban; Cumberland Inlet.
C. fuliginosa, *Sternb. & Hoppe*	Cape Searle; Black Hook.
C. stans, *Drejer*	Cape Searle; Durban.
C. compacta, *R. Br.*	Operniwick.
Lycopodium Selago, *L.*	Cape Lawson; Durban, sea-level to 800 feet.
Equisetum arvense, *L.*	Durban Harbour.
Cystopteris fragilis, *Bernh.*	Black Hook, at 400 feet.

On a new species of *Bellevalia* from Mount Ida. By MAXWELL T. MASTERS, Esq., Lecturer on Botany at St. George's Hospital, &c. Communicated by the SECRETARY.

[Read May 6, 1858.]

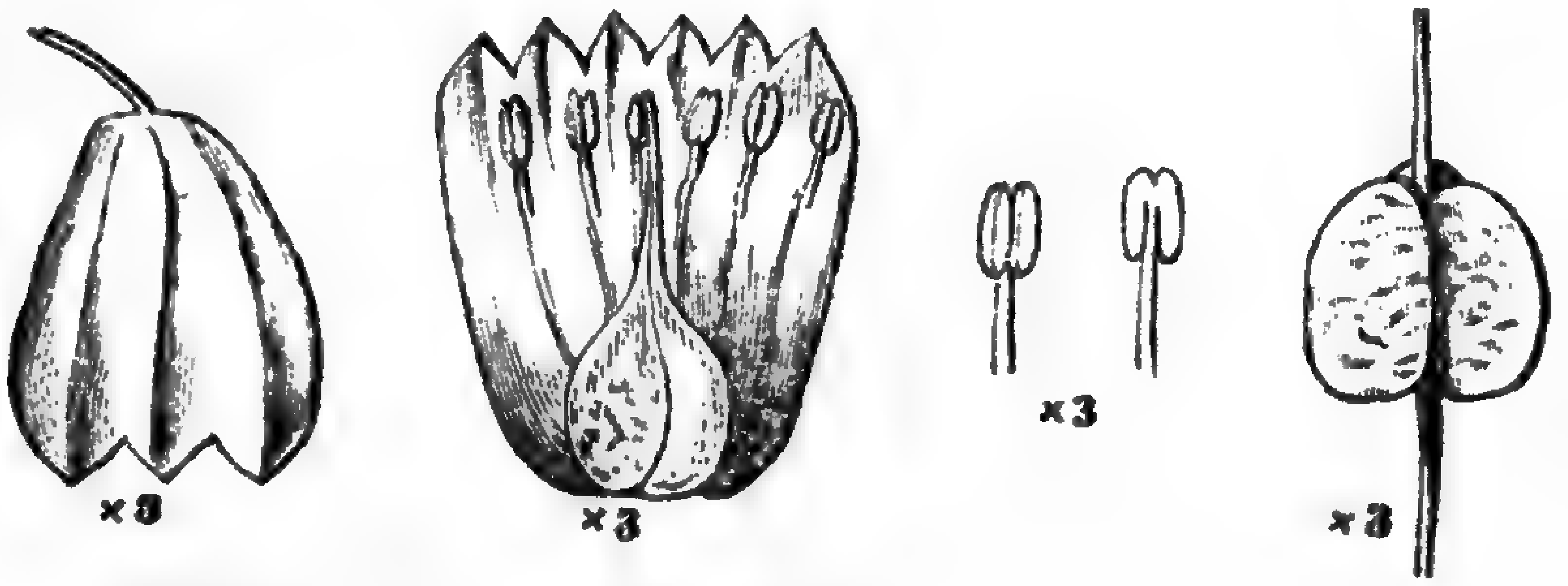
AMONG the plants collected on Mount Ida by the medical officers attached to the Civil Hospital at Renkioi, during the Crimean war, is what appears to be a new species of *Muscari*, or rather of *Bellevalia*, Kunth. For this opportunity of describing it, I am indebted to my friends Drs. Armitage and Playne; and I regret that the name proposed for it (supposing it to be an undescribed species of *Muscari*) is not applicable. Under this name, *Muscari latifolium*, it has been described by Dr. Kirk, one of its discoverers, in a paper read before the Botanical Society of Edinburgh, in January, and reported in the 'Edinburgh New Philosophical Journal' for April. But though in habit and external appearance it presents the greatest resemblance to the species of *Muscari*, yet the form of the perianth and the consolidated condition of the styles and stigmata necessitate its being placed in the genus *Bellevalia* of Kunth. If I am right in this conjecture, I would venture to propose the name of *Bellevalia Muscarioides* for it, and thus to define its characteristics more fully than has been done in the report above referred to.

Bellevalia. Floribus inferioribus campanulatis basi angulatis pedicellatis horizontaliter patentibus vel pendentibus; superioribus tubulosis sessilibus approximatis neutris; folio unico erecto oblongo-acuto versus basin attenuato.

Descr.—Habit, that of the species of *Botryanthus* or *Muscari*, Kunth.—*Bulb* ovate. *Leaf* erect, oblong-acute, tapering towards the base, 6–8 inches long, greatest width 8–10 lines. *Scape* erect, twice the length of the leaves, bearing an oblong crowded raceme 1–2 inches long; lower pedicels horizontal or pendent, 2–3 lines long, decreasing in length upwards; uppermost flowers sessile. *Bracts* minute, membranaceous, lanceolate. *Perianth* in perfect flowers purple, 2–3 lines long, deciduous, campanulate, angular at the base, not contracted at the throat, limb divided into six short-ovate connivent lobes. Upper flowers azure-blue, tubular, sessile, barren. *Stamens* six, arising from the middle of the tube of the perianth, included. Anthers adnate, bluish. *Ovary* deeply three-lobed, slightly rugose on the surface, three-celled, each cell containing two large flattened ovules superposed. *Style* one, tapering, as long as the ovary, included. *Stigma* entire

Fruit membranaceous, three-celled. *Seeds* two in each cell, large, compressed, testa brown.

The habit and general appearance of this plant are so entirely those of the species of *Botryanthus* or *Muscari*, Kunth, that some doubt may well be entertained as to whether this may not be merely a variety of one of the species of one or other of those genera. If so, the validity of the genus *Bellevalia*, as distinct from the above-mentioned, will be much impaired. In the meantime, as the present plant agrees entirely with the genus *Bellevalia* in the characters derived from the perianth and reproductive organs, no other course seems open than to consider it a new species of that genus.



Contributiones ad Acaciarum Australiæ Cognitionem. By Dr. Ferdinand Mueller, Government Botanist, and Director of the Melbourne Botanic Garden, Victoria. Communicated by George Bentham, Esq., V.P.L.S., with notes on the new species.

[Read May 6th, 1858.]

[Dr. Mueller's contributions are not only valuable for the number of new and well-marked species which he has added to this extensive and polymorphous genus, but still more so for the additional characteristic notes which enable us more or less to complete our knowledge of many species previously published from specimens so incomplete that they could scarcely be recognized. And there is still very much that is doubtful, chiefly from the difficulty of procuring specimens in fruit, or, when procured, of matching them with certainty with the flowering specimens. In so far as the specimens have admitted of it, I have, at Dr. Mueller's request, carefully compared his species with those nearly allied to them, and added any remarks which suggested themselves, at the end of his descriptions. In the few cases where I clearly identified them with others previously described, I have given the published

names, adding his manuscript ones for the purpose of reference, and retaining his characters as completing our previous knowledge of the plants. The following general observations by Dr. Mueller were contained in the letter to Sir W. Hooker, which accompanied this paper.—G. B.]

The Uninerves, although comprising such a large array of species in the southern latitudes of Australia, are exceedingly rare within the tropics. Indeed, only two desert plants of wide range, *A. Sentis* (doubtfully combined by Mr. Bentham with *A. decora*) and *A. salicina*, Ldl., accompany some of their usual companions as far as North Australia; and only a solitary new one, allied to *A. elliptica*, was observed in the Gregorian journey. Those of this group, which extend to subtropical latitudes in East Australia, are for the greater part identical with southern forms (for instance, *Acacia falcata, penninervis, suaveolens, oleifolia*); still *A. podalyrifolia* and *A. prominens*, from Moreton Bay and Wide Bay, are not to be found in Australia Felix. The plant referred by Mr. Bentham, in the 'Linnæa,' to the last-mentioned species, is assuredly distinct, and probably *A. lunata*, Sieber. A new species, of this section, allied to *A. vestita*, seems to be restricted to the warmer parts of the east coast, while my southern collections exhibit three other unknown kinds. I feel very reluctant to combine our common *A. reclinata* with what I assumed to be *A. leprosa*, which is with us a rare species, occurring towards the sources of the Yarra. Unfortunately, many kinds ripen the fruits so rarely, that one of the best specific characters for distinction in this genus also remains often beyond avail. *A. imbricata*, from Spencer's Gulf, belongs to the Uninerves, not to *A. conferta* amongst *Brunioideæ*, which I noticed near Wide Bay. The habitat "Ponindi," mentioned under *A. verniciflora* in the 'Linnæa,' vol. xxvi., belongs to *A. dodonæifolia*, Bauer having, no doubt, collected it on the very spot, near Port Lincoln. *A. salicina* is remarkable for the scarlet arillus which surrounds the seed,—a character in which, as far as I know, only *A. melanoxylon* participates. *Acacia gladiiformis* and *A. hakeoides* seem combinable. Nearly related to them is *A. notabilis*, a desert plant of Spencer's Gulf and Lake Torrens, but scarcely referable to *A. obtusata*, Sieb., a mountain-plant of East Australia. I venture also to deviate from Mr. Bentham's opinion when he unites *A. microcarpa* (singular for the smallness of its fruit) with *A. buxifolia*; for the figure in Sir W. Hooker's 'Icones Plantarum' seems to exhibit something very different.

The section Brachybotryæ is not well represented in the tropics. We observed of it, in Mr. Gregory's expedition, only two new species,—one with winged fruit, the other an *Acacia* from N.W. Australia, mentioned by Mr. Bentham under *A. melanoxylon* as imperfectly known from Cunningham's collection, and of which a full description will be found in the accompanying pages. Both show the rather unusual character amongst phyllodineous *Acaciæ*, of being deprived of the strophiolum. *A. complanata* and *A. venulosa* are not found beyond the warmer parts of East Australia. Unless imperfect specimens misled me in judging, I may pronounce that *A. pendula* and *A. sclerophylla* extend through Central Australia to Arnhem's Land, where *A. translucens* was likewise noticed. We possess a common desert-plant in South Australia and Australia Felix, enumerated in the 'Linnæa' (1856) as *A. elongata*; it seems to me not identical with the Blue Mountain plant, which I have compared, but rather to belong to *A. viscidula*. *A. multinervia* is found rarely in this colony; but quite common is *A. homalophylla*, from Lake Torrens to the Darling and Murray, where *A. stenophylla* likewise occurs. In a retrospective view it will be seen that 64 well-marked species alone occur in the collections of the North Australian Expedition, of which, after a patient scrutiny, I am obliged to admit 33 as new. By a further addition of some unpublished extratropical kinds, already contained in my former collections, the number of Australian Acacias becomes advanced to beyond 300, notwithstanding that some reductions of former species have been effected on this occasion. Most singular is the vast preponderance of *Juliferæ* in N. Australia, being nearly equal in number to those of all other sections collectively. Only 4 desert-species traverse Australia from south to north; and 8 only have hitherto been traced from Western Australia into the south-eastern portion of this continent. If, on the contrary, I rightly unite *Acacia cuspidata* with *A. diffusa*, not one of the Tasmanian species shows itself restricted to that island, except *A. axillaris*.

Mr. Gregory observes that no pinnate-leaved *Acacia* is harboured by the interior of West Australia.

Series I, *Phyllodineæ*.

§ 1. *Aphyllæ*.

1. Acacia spinescens, *Bth. in Hook. Lond. Journ. of Bot.* i. p. 322, pl. 2.

Ad sinum Spencer's Gulf, *C. Wilhelmi*. Ad sinum St. Vincent's Gulf, prope montes Barossa Range. Ad flumen Onkaparinga.

Legumina glabra coriacea valde curvata fusca basi acuta apice obtusa enervia tenuiter marginata, intus continua inter semina valde contracta, 1½" longa v. breviora, 1½''' latitudine vix excedentia. *Semina* turgide ovata 1''' tantum longa nitentia sordide obscuro-fusca utrinque areola cinerascenti notata. *Strophiolum* pallidum cymbiformi-acuminatum dimidium semen saltem æquans.

§ 2. *Alatæ.*

2. Acacia Muelleri, *Benth. in Linnæa,* xxvi. p. 603. (Acacia megaphylla, *Ferd. Mueller,* MS.)

In ditione districtus Portus Lincoln, *C. Wilhelmi.*

Phyllodia crasso-coriacea raro oblongo-lanceolata. *Capitula* læte lutea. *Calyx* 1''' circiter longus glaber campanulato-cylindraceus; dentes breves triangulares *conniventes. Petala* lanceolato-linearia inferne cohærentia. *Legumina* coriacea fusca compressa oblonga ad crassum marginem flexuosa oligosperma circ. 1¼" longa, fere ¼" lata, in stipitem brevem contracta, intus continua. *Semina* compresso-ovata e sordide cano et nigro variegata. *Strophiolum* lividum cymbiformi-lanceolatum acuminatum in funiculum longissimum varie implexum rufum transiens.

[In publishing this species as *A. Muelleri*, I stated my reasons for not adopting Dr. Müller's manuscript name, which appeared to me too little appropriate in a genus which contains so many species with phyllodia twice or three times as large.—G. B.]

§ 3. *Armatæ.*

3. Acacia armata, *R. Br. in Ait. Hort. Kew.* ed. 2. vol. v. p. 463.

Ad sinum Spencer's Gulf, *C. Wilhelmi.*

§ 4. *Triangulares.*

4. Acacia pravifolia, n. sp. Puberula, *ramulis* rigidis *spinescentibus* teretibus striatis, stipulis brevibus setaceis v. subulatis deciduis, phyllodiis parvis triangularibus crasso-coriaceis paucinerviis acutis mucronatis, angulo superiore valde protracto obtuso eglanduloso, capitulis subsessilibus v. breviter pedunculatis axillaribus solitariis, *bracteolis magnis subcordatis,* sepalis spathulatis diu cohærentibus corollam dimidiam æquantibus margine ciliolatis, *leguminibus pubescentibus spiraliter contortis.*

In montibus Flinders et Elder's Range, et ad Crystal Brook.

Phyllodia 1½–3''' longa et lata, iis *A. decipientis* non absimilia, nervo infimo magis prominente. *Flores* 1''' longi. *Calyx* satis laxus. *Legumina* circ. 1½''' lata.

Illustris Bentham forsan optime judicans hancce speciem cum sua *A. sublanata* combinat, tacens autem de bracteolarum indole et ramorum rigiditate pungente. Nec vidit pedunculorum brevitatem. *Le-*

gumina pæne cincinnata contorta affinitatem cum *A. obliqua* et *A. acinacea* demonstrant.

[Dr. Mueller's specimens were so very imperfect, that I was unable to detect any specific difference between them and *A. sublunata*. The branches in Bauer's specimen are not pungent; but they are almost as stiff as in Mueller's, and they may not unlikely become pungent. The bracts, however, in Bauer's plant certainly are not such as Müller describes them; they are broad at the base, with a narrow subulate point as long as the flower.—G. B.]

5. Acacia obliqua, *All. Cunn. ex Benth. in Hook. Lond. Journ.* i. 334.

Prope montes Buffalo Range. Ad sinum St. Vincentii alibique in colonia South Australia.

Frutex pluripedalis, ramis sæpe arcuatis. *Ramuli* plurimi conspicue angulati. *Calyx* 5-partitus corollæ dimidium subæquans, laciniis spathulato-linearibus. *Legumina* fuscescentia ætate fere nigrita tenui-coriacea insigniter cincinnato-spiralia stipitata enervia circiter 1½''' lata. *Semina* subfusco-nigrescentia fere reniformia nitentia 2''' longa breviter pallide strophiolata.

Variat glabra et pubescens.

6. Acacia pravissima (*Ferd. Mueller, First Gen. Report; Benth. in Linnæa,* xxvi. p. 608, *adnot.*). Arborescens, glaberrima, virens, ramulis gracilibus angulosis, stipulis perminutis subulatis v. obliteratis, phyllodiis parvis tenui-coriaceis oblique triangularibus v. trapezoideis mucronulatis opacis imperfecte binerviis venosis supra basin glandulam gerentibus, angulo superiore rotundato-obtuso, racemis polycephalis phyllodia longe superantibus summis paniculam constituentibus, bracteis minutis cymbiformi-deltoideis, capitulis paucifloris, bracteolis rhomboideis fimbriatis, calyce obtuse 5-dentato petalis fere triplo breviore, leguminibus compressis linearibus tenui-coriaceis obtusis breviter stipitatis fuscescentibus enerviis margine repandis intus continuis, seminibus nigritis compresso-ovatis minutim livide strophiolatis vix areoligeris.

In vallibus et ad torrentium ripas tractus Buffalo Range et secus partes superiores fl. Snowy River.

Arbuscula v. *frutex* pulcherrimus flexilis altitudinem 20' attinens. *Cortex* sordide fuscus lævis. *Rami* sæpe recumbentes. *Ramuli* elongati adscendentes. *Phyllodia* utplurimum 3–4''' rarius ad 6''' longa et lata, sessilia, nervis antice evanescentibus, supero tenuiore. *Racemi* jam ante anthesin 1–2-unciales. *Flores* tantum e residuis annotinorum descripti. *Legumina* bipollicaria v. breviora, 2''' lata. *Semina* sesquilineam metientia.

Stirps quam maxime memorabilis, species triangulares, quibuscum phyllodiis convenit, cum quibusdam sectionis uninerviarum inflorescentia convenientium (e. g. *A. vestita, A. cultriformi,* et *A. scapuliformi*) conjungens. Anth. vere.

[This will probably prove a very distinct species, if more perfect specimens show the inflorescence to be normal. The capitula appear to be reduced to a single flower each, and are arranged in a simple raceme; but it is not impossible that the whole may be a monstrous or abnormal elongation of the axis of a single capitulum.—G. B.]

7. Acacia stipulosa, n. sp. Glanduloso-pubescens, ramulis teretiusculis, *stipulis persistentibus setaceis inferne connatis* ciliolatis, phyllodiis confertis parvis oblique lanceolatis curvatis mucronatis tenuiter plurinerviis, margine supero prope medium glanduligero, pedunculis axillaribus solitariis monocephalis phyllodium superantibus capitulis globosis multifloris puberulis, bracteolis acutissimis, *sepalis* liberis linearibus obtusis *corollæ subæquilongis*, leguminibus coriaceis latolinearibus hispidulis curvatis sessilibus intus subcontinuis inter semina non contractis, seminibus ovatis leviter compressis lucenti-nigris utrinque impressis strophiolo pallido plicato triplo breviore suffultis.

Secus partes australes fluminis Victoriæ. *Hb. M.* No. 71.

Phyllodia 1¼–3''' longa, 1–1¼''' lata, mucrone tenui terminata. *Stipulæ* 1–1½''' longæ. *Capitula* læte lutea. *Corolla* vix 1''' longa. *Legumen* circiter sesquipollicare acutum, 3''' latum, satis compressum dilute fuscum. *Semina* 1½''' longa.

Huc pertinere videtur *A. deltoidea β. pungens*, Bth. *l. c.* p. 333, vix autem varietas primaria *Cunninghami*.

[This plant differs from the true *A. deltoidea* chiefly in the hairy pod; it is also generally more downy; but I have still considerable doubts whether it will not prove a mere variety of *A. deltoidea*.—G. B.]

8. Acacia Gunnii, *Benth. in Hook. Lond. Journ.*, i. p. 332; *J. D. Hook. Fl. Tasman.*, t. xviii. (A. vomeriformis, *A. Cunn. ex Bth. l. c.*)

In montibus ad sinum St. Vincent's Gulf et coloniæ Victoriæ, e. g. Grampians, Mount Alexander, &c.

§ 5. *Pungentes.*

9. Acacia latipes, *Benth. in Hook. Lond. Journ. of Bot.* i. p. 334. n. 40.

Ad sinum Spencer's Gulf, *C. Wilhelmi.*

Quidem nec flores nec fructus vidi; speciem autem phyllodiorum forma facile recognitam hac occasione nolui prætërire.

10. Acacia phlebocarpa, n. sp. Fruticosa, viscidula, parce puberula, mox glabrata, ramulis teretiusculis, phyllodiis patentibus angustolanceolatis acutis subsessilibus breviter mucronatis basi minute glanduligeris multinerviis æquilateris, nervo mediano prominente, stipulis triangularibus acuminatis, pedunculis axillaribus solitariis monocephalis phyllodio parum v. dimidio brevioribus, sepalis oblongo-linea-

ribus obtusis demum liberis vix corollæ dimidium æquantibus, legumine fuscescente coriaceo arcuato acuto subsessili marginato compresso venoso imperfecte oblique septato, seminibus nitenti-nigris ovato-rotundis leniter compressis areolam circularem utrinque gerentibus strophiolo bilobo pallido basi amplexis.

Hab. In locis petræis ad ortum fluvii Seven Emu River sinus Carpentariæ. No. 41.

Frutex 2–5′. *Phyllodia* rigidula 1–1½″ longa, 1½–2½‴ lata. *Pedunculi* crassiusculi. *Flores* glutinosi 1‴ paulo excedentes. *Legumina* 1–2″ longa, circiter 2‴ lata. *Semina* 1⅛‴ longa.

[Closely allied to *A. cochlearis*, Labill. The phyllodia are rather thicker; the nerves, especially the lateral ones, less distinct; the minute brown stipules are broader, and the pod broader, thicker, with a more thickened margin, and much curved, that of *A. cochlearis* being nearly straight.—G. B.]

11. Acacia colletioides, *Benth. in Hook. Lond. Journ. of Bot.* i. p. 336. n. 46.

Ad sinus St. Vincent's Gulf and Spencer's Gulf.

Legumen arcuatum v. cyclicum tenui-coriaceum 1–1¼″ longum, circiter 2‴ latum, extus sordide fuscum, intus continuum sessile acuminatum. *Semina* obscure fusca nitentia ovato-globosa turgida 1‴ paulo excedentia strophiolo cymbiformi fuscescente prædita.

12. Acacia siculæformis (*Cunn.*; *Benth. in Lond. Journ. Bot.* i. p. 337.—Acacia patens, *F. Muell.* MSS.). Glabra, erecta, ramulis teretiusculis, *phyllodiis reverso-patentibus* coriaceis angusto- et oblique lanceolatis basi angustatis apice acutis mucronatis uninerviis indistincte venulosis prope basin et juxta medium obscure glanduligeris, stipulis minutis agglutinatis lanceolato-subulatis, pedunculis axillaribus solitariis phyllodia paulo superantibus monocephalis, capitulis globosis multifloris, leguminibus chartaceis linearibus rectis compressis enerviis spadiceis gracili-stipitatis intus continuis ad suturas flexuosis, *seminibus* ovatis leniter compressis minutissime strophiolatis obscure fuscis nitidis.

Ad rivos Hooker's et Sturt's Creek. No. 4.

Phyllodia 4–10‴ longa, 1–1½‴ lata. *Flores* evoluti desunt. *Legumina* 1–1½″ longa et totidem lineas lata tenuiter marginata. *Semina* 1‴ paulo excedentia.

A. diffusæ proxima.

Alteram hujus sectionis speciem tropicam et probabiliter *A. siculæformi* proximam absque floribus fructibusque vidi in montibus inter flumen Suttor et planitiem Peak Downs sitis.

[F. Mueller's specimens of *A. patens* appear to agree in every respect with the original ones of *A. siculæformis*.—G. B.]

13. Acacia Stuartiana, *Ferd. Muell. et Benth. in Linnæa*, xxvi. p. 609; *J. D. Hook. Fl. Tasman.* p. 104, t. 19.

Frutex orgyalis amplus v. humilior. *Semina* ovata satis turgida 1''' paulo longiora e spadiceo nigrita lucida.

14. Acacia cuspidata, *All. Cunn. ex Benth. in Hook. Lond. Journ.* i. p. 337. n. 51.

Haud rara in colonia Victoriæ.

Legumina lato-linearia leniter compressa parum curvata fusca enervia marginata breviter stipitata acuminata 1½–3'' longa, 2''' lata v. paulo latiora ad suturas recta intus continua, valvis coriaceis chartaceis. *Semina* atra vix nitidula ovata leniter compressa 1½–2''' longa, strophiolo brevi crassiusculo sordide fulvescente suffulta.

15. Acacia Brownii, *Steudel, Nomencl. Bot.* i. p. 2.

Variis locis in Australia Felice.

Legumina chartacea dilute fusca. *Semina* nitida nigro-spadicea 1½''' longa ovata leniter compressa strophiolo brevi fulvescente prædita.

16. Acacia rupicola, *Ferd. Mueller ex Benth. in Linnæa* xxvi. p. 610.

In montibus Lofty Range et ad flumen Bremer.

Legumina bipollicaria vel breviora circiter 2''' lata fuscescentia compressa coriacea plus minusve curvata indistincte venulosa intus continua, basi stipitato-attenuata. *Semina* nigro-fusca nitidula circiter 2''' longa compresso-ovata strophiolo pallido majusculo prædita.

17. Acacia sphacelata, *Benth. in Hook. Lond. Journ. of Bot.* i. p. 338. n. 34. (A. tetragonophylla, *Ferd. Muell.* No. 6.)

In pascuis siccis subsalinis ad lacum Torrens.

Frutex divaricato-ramosissimus, raro arbuscula. *Rami* validi cano-nigrescentes. *Phyllodia* ½–1½'' longa, ½–1''' lata. *Pedunculi* axillares solitarii vix semunciales. *Sepala* linearia obtusa prorsus libera et distantia, corollæ dimidium æquantia apice non nigrescentia. *Bracteolæ* spathulato-lineares. *Legumina* sessilia compressa valde curvata marginata.

Specimina dubie huc relata, a cl. Bentham ad *A. Brownii* reducta.

18. Acacia ovoidea, *Benth. in Hook. Lond. Journ.* i. p. 339, f. ; *Hook. Flor. Tasman.* p. 105. t. xx.

In paludosis et irriguis coloniæ South Australia affatim occurrens. In terra Gipps Land et aliis partibus coloniæ Victoriæ minus frequens quam *A. verticillata*.

19. Acacia verticillata, *W. Sp. Pl.* iv. p. 1049.

γ. *cephalantha*, phyllodiis tenuissimis setaceo-subulatis, spicis depauperatis ad capitula subglobosa reductis, calycibus corolla ter quaterve brevioribus.

Ad umbrosas subsalinas fluvii Yarra.

Varietas insignis solo peculiari orta clare in formam normalem transiens.

20. Acacia Riceana, *Henslow in the Botanist*, iii. p. 135.

In silvis densis montium ad Sealers' Cove.

Antea tantum in Tasmania reperta.

§ 6. *Calamiformes.*

21. Acacia pinifolia (*Benth. in Mitch. Subtrop. Austr.* p. 342.—*Acacia tenuissima*, n. sp.). Glabra, ramulis teretiusculis, phyllodiis tenuissimis elongatis tetragono-filiformibus curvato-mucronulatis, stipulis minutis deltoideis diu persistentibus, pedunculis brevibus solitariis monocephalis, leguminibus chartaceis lato-linearibus rectis compressis marginatis enerviis ad suturas vix flexuosis breviter stipitatis basi et apice acutis.

In locis lapidosis aridis ad originem fluvii M'Arthur sinus Carpentaria Gulf. No. 5.

Frutex 5–8'. *Phyllodia* 3–8" longa, $\frac{1}{4}$–$\frac{1}{3}$''' tantum crassa. *Flores* desunt. *Pedunculi* leguminigeri fere semunciales. *Legumina* 2–4" longa, $1\frac{1}{2}$–$2\frac{1}{2}$" lata. *Semina* matura deficiunt.

Num eadem sit ac *Acacia pinifolia* (Bentham in Mitchell, Trop. Austr. p. 342) comparatio speciminum docebit.

[These specimens are in fruit; Mitchell's were in flower; but they appear in other respects identical. Dr. Mueller had inadvertently given the name of *A. tenuissima* to two species; but the present one proving to be already published, his name will be retained for the one described below (No. 74).—G. B.]

22. Acacia chordophylla, *Ferd. Muell. ex Benth. in Linnæa*, xxvi. p. 612.

Ad fluvium Murray.

Corolla calycem ciliolatum semisuperans. *Legumen* $1\frac{1}{2}$–2" longum et totidem lineas latum chartaceum dilute fuscum inter semina flexuoso-constrictum. *Semina* ovata *nitenti-fusca* leviter compressa $1\frac{1}{2}$''' longa strophiolo livido fere 1''' metiente suffulta.

A. ephedroidi inter *Juliferas* valde cognata.

23. Acacia leptoneura, *Benth. in Hook. Lond. Journ.* i. p. 340. n. 64.

Ad sinum Spencer's Gulf, *C. Wilhelmi.*

Frutex laxus ramosissimus pluripedalis. *Phyllodia* in speciminibus cultis multo longiora et magis compressa quam in spontaneis *A. chordophyllæ*, abs quo etiam differre videtur corolla calycem paulo nec semisuperante. *Pedunculi* capitulo æquilongi appresso-puberuli.

24. Acacia sericophylla, n. sp. Subsericeo-puberula, ramis teretiusculis, phyllodiis filiformi-linearibus elongatis muticis subtilissime striolatis, floribus . . . . , leguminibus coriaceis elongatis curvatis torulosis inter semina conspicue constrictis extus tenuissime cano-puberulis.

In eremo ad flumen Suttor.

Phyllodia 5–8''' longa, 1''' lata, compresso-filiformia canescentia. *Legumen* circiter semipedale circiter 4''' latum. *Semina* et flores nondum visa.

Species *A. calamifoliæ* proxima.

[Of this I have seen no specimen.—G. B.]

25. Acacia nematophylla, *Ferd. Muell. ex Benth. in Linnæa*, xxvi. p. 612.

Spencer's Gulf, *C. Wilhelmi.*

Legumina pluripollicaria, circiter 3''' lata, coriacea corrugata, demum fuscescentia, satis compressa, ad suturas flexuosa. *Semina* atra opaca ovata v. oblongo-ovata satis compressa strophiolo crasso fulvido fere cymbiformi 1''' longitudine excedente suffulta.

*Acacia Wilhelmiana**, a cl. Bentham, *l. c.*, cum *A. nematophylla* conjuncta mihi satis singularis videtur viscíditate, phyllodiis brevioribus obtusioribus et leguminibus multo minoribus vix 1¼''' latis. Ceterum vidi nulla hujus speciei exemplaria nisi imperfecta.

Frutex orgyalis satis amplus.

Specimina cujusdam *Acaciæ* ad sinum Spencer's Gulf a C. Wilhelmi collecta, phyllodiis *A. calamifoliæ* simillima legumine compresso (etsi magis recto et vix flexuoso) ad *A. nematophyllam* accedens, aut hujus format varietatem insignem aut potius speciem propriam phyllodiis longioribus acutioribus, legumine fere chartaceo et strophiolis angustioribus singularem.

§ 7. *Brunioideæ.*

26. Acacia lycopodifolia, *All. Cunn. in Hook, Ic.* ii. t. 172.

In clivis petræis ad flumen Victoriæ.

Frutex 2–3' diffusus. *Rami* cano-pubescentes. *Flores* puberuli. *Calyx* corolla breviter 5-loba fere quater brevior, acute dentatus. *Bracteolæ* diu persistentes angusto-lanceolatæ v. lineares acutissimæ ciliatæ circiter 1''' longæ. *Legumina* sessilia 1–1¼" longa circ. 2½''' lata marginata fusca. *Semina* pauca v. plura, immatura late ovata nigrita compressa strophiolo cymbiformi triplo breviore livido prædita.

27. Acacia galioides, *Benth. in Hook. Lond. Journ. of Bot.* i. p. 344.

In præruptis rupestribus ad flumen Victoriæ.

Frutex humilis. *Bracteolæ* lanceolatæ acutissimæ ciliolatæ infracto-unguiculatæ. *Calyx* triente corollæ pubescentis paulo longior acute dentatus. *Legumina longe stipitata* valde compressa fuscescentia marginata parce viscidulo-puberula bipollicaria vel breviora, vix 3''' lata, transverse plus minus impressa. *Semina* 10 v. pauciora, immatura iis *A. lycopodifoliæ* similia.

28. Acacia asperulacea, n. sp. Glabra v. pubescens, ramulis tenuibus teretiusculis, stipulis lanceolato-linearibus subulatis subappressis, phyllodiis verticillatis teretiusculis subcanaliculatis apice recurvis mucronulatis, pedunculis phyllodia superantibus, capitulis multifloris, bracteolis unguiculatis lanceolato-linearibus acutissimis, calycis 5-fidi dentibus acutissimis, corolla 5-loba striolata calycem fere duplo superante, leguminibus rectis lato-linearibus sessilibus compressis

* Ferd. Mueller, in Transact. Phil. Society Victoria, p. 37.

basi et apice acutis marginatis fuscis lævibus continuis, seminibus . . . .

In plaga petræa (Sandstone table-land) terræ Arnhemicæ et ad flumen Victoriæ. Hb. M. 1 & 73 partim.

Rami adscendentes. *Phyllodia* 2–4‴ longa, in quoque verticillo 8–14. *Stipulæ* lineam metientes v. breviores. *Capitula* 3–4‴ diametro tenentia nec ut in *A. Baueri* minima. *Legumina* circiter 1½″ longa, 2‴ lata.

[Closely allied to the *A. Baueri*, of which it has the foliage; but the heads of flowers, as well as the flowers themselves, are twice the size. —G. B.]

29. ACACIA SUBTERNATA, n. sp. Glabra, ramulis angulatis sulcatis junioribus innovationibusque viscidulis, stipulis minimis v. obliteratis, *phyllodiis* lineari-filiformibus compressis ut plurimum *ternatim confertis* rarius geminis sparsisve brevissime recurvo-cuspidatis, pedunculis solitariis phyllodia superantibus, capitulis multifloris glabris, calycis corolla semibrevioris 5-partiti laciniis spathulato-linearibus obtusis, legumine plano crasso-coriaceo marginato lanceolato sensim in basin longe angustato oblique striato et oblique septato, seminibus . . . . . .

In plaga elevata petræa terræ Arnhemicæ ad flumina Victoriæ (No. 73 partim), *Roper et Limmen*; Bight River.

Frutex 3–5′. *Phyllodia* 3–6‴ longa, vix ½‴ lata. *Corollæ* 5-fidæ circ. 1‴ longæ. *Legumina* addito stipite 1½–2″ longa, 2–2½‴ lata.

Species insignis, quintæ seriei Juliferarum quoad legumina approximans, ceteroquin ad *Brunioideas* certe pertinens.

[Appears to be a good species. The arrangement of the phyllodia (should it prove constant) is singular: they are neither verticillate, as in the *Brunioidea verticillata*, nor solitary at each node, as in the *Brunioidea sparsifolia*; but in most cases in fascicles of 2, 3, or 4 from each node, something like the leaflets of *Aspalathus*.—G. B.]

30. Acacia conferta, *All. Cunn. ex Benth. in Hook. Lond. Journ. of Bot.* i. p. 345.

Near Balmy Creek and near Mount Mereval, *Sir T. H. Mitchell*. In collibus ad flumen Dawson, *Ferd. Mueller*, No. 2.

Frutex 1–2-orgyalis. *Phyllodia* semuncialia v. breviora marginulata (nullo modo ut habet cl. Bentham margine revoluta) in speciminibus suppetentibus acuta. *Calyx* 5-fidus, lobis obtusis. *Legumina* 1–1¼″ longa, circiter ¼″ lata, valde compressa, coriacea, pruinosa, ad suturas flexuosa, oligosperma. *Semina* 2‴ longa opaco-nigra non areolata, strophiolo sublivido 1‴ longo cymbiformi sustenta.

§ 8. *Uninerviæ.*

31. Acacia dictyocarpa, *Benth. in Linnæa*, xxvi. p. 616.

In virgultis ad flumina Hutt et Hill River, prope St. Vincent's Gulf,

ad flumina Darling, Murray, et Murrumbidgee, in virgultis, ad lacum Alexandrinæ.

Frutex speciosus 3–5'. *Semina* 1½–2''' longa opaca atra compresso-ovata, areola laterali conspicua. *Strophiolum* lividum cymbiforme longe acuminatum dimidium seminis paulo excedens.

32. Acacia argyrophylla, *Ferd. Mueller, Coll. Bot.* 1847 et seq.

Ad flumen South Rhine in virgultis.

Frutex pluripedalis amplus. *Legumina* nigrescentia iis *A. dictyocarpæ* latiora.

33. Acacia podalyrifolia, *A. Cunn. in G. Don, Gen. Syst.* ii. p. 405. n. 85.

Wide Bay, *Moore;* Burnett River, Dawson River, on ridges, *Ferd. Mueller*, No. 16.

Frutex altior. *Legumen* subsessile tenui-coriaceum oligospermum complanatum glaucum puberulum 1½–3" longum, ½–¾" latum, marginatum venosum flexuosum, inter semina contractum. *Semina* nigra ovata satis compressa circiter 2½''' longa opaca, strophiolo crasso fulvido triplo breviore suffulta.

Variat foliis lato-ovatis obtusis et angusto-lanceolatis acutis.

34. Acacia oleifolia, *All. Cunn. in Don, Gen. Syst. Dichlam. Plants,* ii. p. 405.

Wild Dog Creek, near Mount Remarkable. In virgultis ad flumina Dawson, Burdekin, et Burnett River. No. 22.

Capitula reperi pluriflora. *Legumina* subnigrescentia stipitata ut plurimum 1½–2" longa lævia. *Semina* lucenti-nigra leviter compressa ovata, areolis valde indistinctis. *Strophiolum* crassum lividum semine triplo brevius.

Variat phyllodiis sesquilineam latis et fere 2" longis falcatis.

35. Acacia lunata, *Sieb. in DC. Prodr.* ii. p. 452.

In montibus sterilibus dumosis ad flumen Ovens, et in montibus Buffalo Range.

Corolla calycem sinuato-dentatum vix ciliolatum pluries superans.

Specimina e locis supra memoratis cl. Bentham, *l. c.*, partim dubie ad *A. buxifoliam* partim ad *A. prominentem* retulit.

36. Acacia myrtifolia, *Willd. Sp. Pl.*

Frequens in coloniis South Australia et Victoria.

37. Acacia iteaphylla, *Ferd. Mueller ex Benth. in Linnæa,* xxvi. p. 617.

β. latifolia, phyllodiis latioribus et brevioribus.

Ad sinum Spencer's Gulf, *C. Wilhelmi*; *Ferd. Mueller*. Ad ostium fluminis Murray, *Wuerth*.

Frutex orgyalis et altior amplus. *Semina* ovata leviter compressa haud areolata 2''' longa nitidulo-nigra. *Strophiolum* seminis dimidium æquans fulvescens angusto-cymbiforme. Glandula *phyllodii* interdum a basi distans.

38. Acacia pycnantha, *Benth. in Hook, Lond. Journ.* i. p. 351.
Frequens in coloniis South Australia et Victoria.
Arbuscula v. *frutex* altior. *Legumina* recta obscure fusca coriacea lato-linearia marginata 2''' circiter lata, 1½–3'' longa, inter semina quasi articulatim impressa, intus continua, ad suturas non aut parum flexuosa. *Semina* circiter 1½''' metientia oblongo-ovata compressa nitenti-nigra, areola inconspicua. *Strophiolum* cymbiforme acuminatum lividum seminis dimidium superans.

39. Acacia falcata, *Willd. Sp. Plant.* iv. p. 1053.
Ad flumina Brisbane, Burnett, et Dawson River.

40. Acacia penninervis, *Sieb., ex DC. Prodr.* ii. p. 452.
Ad flumina Burnett et Brisbane Australiæ orientalis subtropicæ. No. 13, 14. Broken River! in montibus graniticis ad Snowy River!
Legumina pallide ætate saturate fusca coriacea plana 2–5'' longa, semunciam circiter lata venosa intus continua. *Semina* longitudinalia circiter 2¼''' longa nitenti-atra non areolata ovata leviter compressa. *Strophiolum* obscure lividum cymbiforme acuminatum semini æquilongum. *Funiculi* pars superior crassa plicata.

41. Acacia retinodes, *Schl. Linnæa,* xx. p. 664.
In coloniis South Australia et Victoria non rara.
Frutex altior vel arbor parva. *Legumina* coriacea dilute fusca paulo pruinosa lato-linearia compressa recta stipitata 2–4'' longa, circiter 3''' lata, venulosa, intus continua, ad suturas vix flexuosa. *Semina* oblonga ovata compressa nigra vix nitentia 1½''' longa. *Strophiolum* lividum crassiusculum cymbiforme semine aliquoties brevius.

42. Acacia salicina, *Lindl. in Mitch. Three Exped.* ii. p. 20.
In terra Arnhem's Land, *e. g.* ad flumen Roper, *hb. M.* 12. In eremo ad flumen Suttor, No. 21.
Corolla calycem glabrum triplo superans. *Legumina* plus minus curvata pallida paulo pulverulenta circiter ½'' lata intus continua. *Semina* subrotunda v. late ovata compressa splendenti-nigra lævia 2''' metientia strophiolum coccineum longissimum flexuosum et varie plicatum gerentia.
β. *minor,* phyllodiis et leguminibus conspicue minoribus.
Spencer's Gulf, *C. Wilhelmi*; St. Vincent's Gulf.

43. Acacia hakeoides, *All. Cunn. ex Benth. in Hook. Lond. Journ.* i. p. 354. (A. gladiiformis, *A. C. l. c.*)
In deserto ad fluvium Murray, lacum Torrens et montes Flinders Range.
Frutex 5–6. *Calyx* fimbriolatus corollam dimidiam æquans. *Legumina* fusca inter semina longe tenuiter contracta 3–4'' longa, coriacea,

loculis circiter 3''' latis turgidis. *Semina* oblongo-ovata nigra saltem 2''' longa. *Strophiolum* pallidum cymbiforme acuminatum dimidium seminis æquans.

44. ACACIA NOTABILIS (*Ferd. Mueller*). Glabra, ramulis superne angulatis, *phyllodiis* angusto- v. oblongo-lanceolatis obtusiusculis sessilibus *crasso-coriaceis basi tantum glanduligeris* marginatis uninerviis pallidis venosis, racemis oligocephalis phyllodio brevioribus, leguminibus tenui-coriaceis nigrescentibus angusto-oblongis obtusis planis stipitatis marginatis venulosis parum pruinosis ad suturas rectis, seminibus transverse sitis nigris opacis compressis ovatis strophiolo cymbiformi livido longe acuminato dimidio longioribus areolatis.

In vicinitate portus Lincoln, *C. Wilhelmi*. Ad montes Flinders Range.

Frutex circa orgyalis. *Phyllodia* 2–4'' longa, 4–6''' lata. *Flores* desunt. *Rachis* fructifer flexuosus. *Legumina* $1\frac{1}{2}$–$2\frac{1}{2}$'' longa, circiter 4''' lata intus continua. *Semina* circiter 2''' longa.

Species eremicola dubie a clarissimo Bentham, *Acaciæ obtusatæ* montes cæruleos inhabitanti conjuncta, potius ad *A. hakeoidem* (legumine ceteroquin diversam) appropinquans.

[I have still great doubts whether this species be a good one.—G. B.]

45. Acacia rubida, *All. Cunn. ex Benth. in Hook. Lond. Journ.* i. p. 355.

In collibus petræis inter montes May-day Hills et flumen Ovens. In regionibus montanis graminosis ad flumina King et Delatite. In clivis saxosis ad fluvium Snowy River.

Arbuscula v. frutex.

46. Acacia crassiuscula, *Wendl. Comment. de Acaciis aphyll.* p. 31, t. 8.

β. *angustifolia,* Benth. in Linnæa, xxvi. p. 619.

Ad flumen Snowy River.

γ. *pubescens,* phyllodiis augustioribus et brevioribus glabriusculis, ramulis et inflorescentia pubescentibus.

New South Wales.

δ. *latifolia,* phyllodiis conspicue latioribus e truncato apice oblique cuspidatis.

Snowy River.

Specimina evoluta hujus varietatis nondum vidi.

47. Acacia prominens, *A. Cunn. in Don, Gen. Syst.* ii. p. 406; *non Benth. in Linnæa,* xxiv. p. 620.

Frequens circum Moreton Bay, in montibus ad flumina Pine River et Burnett. Hb. M. no. 15.

Frutex sæpe biorgyalis. *Calyx* repando-dentatus corolla fere triplo brevior ciliolatus. *Legumen* fuscescens leniter pruinosum compressum fere biunciale fere $\frac{1}{2}$'' latum stipitatum chartaceum læve inter semina plus minus contractum. *Semina* ovata leniter compressa

nitidulo-nigra lævia non areolata sesquilineam longa strophiolo brevi crasso livido prædita.

48. Acacia decora, *Reichb. Icon. exot.* t. 199. (Acacia Sentis, *Ferd. Mueller.*)

In Australia centrali, *Sturt*. Ad flumen Victoriæ, *N.* 19. Secus rivos siccos terræ Arnhemicæ, No. 17. "Plains of Promise" sinus Carpentariæ, No. 20. In Australia orientali tropica.

Ramuli inermes v. ætate spinis geminis prædití. *Corolla* glabra, circiter ad trientem divisa, laciniis angustis, tubo tenui calycem semisuperante. *Calyx* profunde quinquepartitus, laciniis spathulato-linearibus apice ciliatis. *Legumina chartacea* complanata, 1–1½" longa, circiter ½" lata, dilute fusca, reticulato-venosa, glabra, oligosperma, inter semina plus minus margine constricta, basi acuta, apice obtusa. *Semina subglobosa* splendentia e fulvo et spadiceo variegata sesquilineam longa, strophiolo brevi carnoso fulvescente prædita.

[The specimens now sent show still more the identity of this plant with the *A. decora*, Reichb.—G. B.]

49. Acacia buxifolia, *A. Cunn. in Field's New South Wales*, p. 344.

Pine Ridges on the Macquarie River, *All. Cunn.* auctoritate illustr. *Hooker.*

β. subvelutina, ramulis innovationibus rachibusque velutinis. *Bracteolæ* rhombeo-cordatæ fimbriolatæ minutæ. *Calyx* fimbriolatus obtuse dentatus petalis fere triplo brevior. *Legumen* nigrescens pruinosum brevissime stipitatum coriaceum marginatum fere ½" latum. *Semina* immatura fere rotunda nigra strophiolo livido prædita.

In tergis montium subalpinorum ad flumen Freestone River.

50. Acacia microcarpa (*Ferd. Mueller, Second Gen. Rep.* p. 7). Glabra, ramulis tenuibus acute angulatis, phyllodiis lineari- v. ovato-oblongis obliquis sessilibus uninerviis obscure venulosis obtusis recurvo-apiculatis infra medium glanduligeris, stipulis minutis deltoideis, leguminibus parvis tenui-chartaceis angustis pallidis arcuatis inter semina parum contractis lævibus, seminibus parvis turgide ovatis nitentibus nigro-fuscis pallide areolatis, strophiolo rotundo-ovato acuminato vix dimidium seminis æquante.

Ad margines fruticetorum ad Tumbey Bay, *C. Wilhelmi.* Ad flumina Avoca et Murray.

Frutex pauci- v. pluripedalis patentim ramosissimus. *Phyllodia* uncialia et breviora 1½–3‴ lata. *Flores* omnino desunt. *Legumina* ¾–1½" longa, circiter 1‴ lata. *Semina* 1‴ paulo excedentia. *Strophiolum* sordide fuscescens.

Species fructus minutie valde singularis ex icone *Hook. Icon.* t. 164, cum *A. buxifolia* neutiquam jungenda.

[Of this I have now no specimen, the fragment I formerly saw having been returned to Mr. Sonder.—G. B.]

51. ACACIA IMBRICATA (*Ferd. Mueller, in herb. Wilhelmiano*). Glabra, ramulis confertis acute angulatis, stipulis obliteratis, phyllodiis parvis confertis sessilibus oblongo- v. cuneato-linearibus uninerviis aveniis *apice obtusis glanduligeris* et oblique cuspidato-apiculatis, pedunculis axillaribus solitariis phyllodia superantibus, floribus . . . ., leguminibus dilute fuscis lato-linearibus chartaceis subsessilibus ad suturas rectis leviter compressis pleio- v. polyspermis, seminibus rotundo-ovatis leniter compressis nitentibus nigrescentibus strophiolo cymbiformi acuminato fere duplo longioribus.

Tumbey Bey, Spencer's Gulf ad margines fruticetorum, *C. Wilhelmi.*

Frutex densus 3–4′ altus. *Phyllodia* crassiuscula 2–6‴ longa, ½–1‴ lata. *Pedunculi* tenues circiter semunciales. *Legumen* (a *Benthamio in Linnæa*, xxvi. p. 614, sub *A. conferta* descriptum) 1½–2″ longum, 2–3‴ latum. *Semina* fere 1½‴ longa utrinque distincte areolata.

Species certo ad uninervias pertinens, *A. lineatæ* affinis, a *Benthamio, l. c.*, perperam cum *A. conferta* e *Brunioidearum* serie conjuncta, quæ differt habitu multo altiore: ramis pubescentibus non distincte angulatis, phyllodiis acutis glandula terminali orbatis, nervo nullo v. indistincto præditis, satis evidenter marginulatis, legumine valde compresso multo latiore stipitato pruinoso oligospermo, ad suturas flexuoso, seminibus majoribus minus nitentibus magis compressis haud distincte areolatis et forsan quoque floribus.

[Dr. Mueller may be correct in referring this to the Uninerviæ next *A. lineata.* My specimen is too imperfect to determine the point. —G. B.]

52. Acacia acinacea, *Lindley in Mitch. East Austr.* ii. p. 267.

In parte australi coloniæ Victoriæ, a montibus Grampianis usque ad rivum Forest Creek, necnon ad portum Phillip.

Frutex pluripedalis amplus ramosissimus, ramis sæpe recurvatis. *Calyx* 5-partitus corollam vix semiæquans, laciniis lineari-spathulatis. *Legumen* spirale quasi cinnatum, ei *A. obliquæ* persimile. Transitum igitur a speciebus uninerviis ad triangulares parat.

53. Acacia aspera, *Lindl. l. c.*

In locis sterilioribus virgultorum et nemorum Australiæ Felicis; *e. g.* Grampians, Black Forest, Goulburn et Broken River.

Frutex pluripedalis valde ramosus. *Legumina* arcuata leviter compressa 1–2″ longa, vix 1½‴ lata, dilute fusca hispidula, ad suturas plus minusve flexuosa, basi et apice acuta. *Semina* nigrescentia ovata sesquilineam longa, strophiolo carnoso fulvido prædita.

54. Acacia montana, *Benth. l. c.*

Differt ab *A. leprosa* phyllodiis minoribus obscure bi- v. plurinerviis juxta basin conspicue glanduligeris, capitulis multo intensius luteis,

pedunculis glabris et bracteolis brevioribus. *Flores* similes. *Corolla* 5-fida calycem obtuse 5-lobum puberulum semiæquans. *Bracteæ* ad pedunculorum basin rotundæ conspicuæ.

In collibus ad flumen South Rhine.

A. sclerophylla, Lindl., cum hac confluit, nisi fructu differt.

55. Acacia exsudans, *Lindl. in Mitch. East Australia*, ii. p. 216.

Differt ab *A. reclinata* et *A. leprosa* phyllodiis divaricatis brevioribus et obtusioribus minutim apiculatis non apice sphacelatis, nervo secundario secus marginem superum percursis, calycibus magis glabris, ab *A. leprosa* præterea glandula minore basali, capitulis minus læte luteis. *Legumina* 1-2″ longa, 1½-2‴ lata, breviter stipitata, viscoso-puberula lato-linearia recta compressa sordide fusca coriaceo-chartacea. *Semina* ovato-oblonga nitentia fusco-nigra 1½‴ metientia longe areolata. *Strophiolum* crassum breve.

56. Acacia dineura, n. sp. Fruticosa, glabra, ramulis striato-angulatis, phyllodiis chartaceis angusto-oblongis v. oblongo-lanceolatis obtusis leniter falcato-curvatis *binerviis* reticulato-venosis ad basin minute glandulosis, pedunculis axillaribus monocephalis solitariis phyllodio pluries brevioribus, leguminibus complanatis stipitatis elongato-oblongis marginatis venosis, suturis leniter undulatis.

In plaga arenoso-rupestri juxta originem fluviorum Roper et Limmen, Bight River terræ Arnhemicæ, *h. M.* no. 31.

Frutex altior. *Phyllodia* 2-3″ longa, 3-8‴ lata. *Areolæ* venationis magnæ. *Pedunculi* tenues semunciam paulo excedentes. *Legumina* (immatura tantum visa) 2½-5″ longa, circiter ⅔‴ lata. *Flores* et *semina matura* nondum cognita.

A. ellipticæ, Cunn. in Hook. Lond. Journ. i. p. 347, et *A. hemignostæ* proxima.

[Appears to be a distinct species. The phyllodia are thinner and differently shaped from the few 2-nerved species known with solitary flower-heads.—G. B.]

57. Acacia leprosa (*Sieb. in DC. Pr.* ii. 450). Elatior, ramulis angulatis apice vix puberulis cernuis v. nutantibus, phyllodiis chartaceis patentibus elongato- et angusto-lanceolatis leviter curvatis sphacelato-apiculatis brevissime petiolatis basi et apice longe angustatis glabris viscoso-punctatis uninerviis tenuiter reticulato-penniveniis supra basin conspicue uniglandulosis, pedunculis axillaribus geminis–quinis cano-velutinis capitulo citrino multifloro æquilongis, corolla glabra 5-fida calycem subvelutinum dentatum semisuperante, bracteolis lanceolatis, leguminibus . . . .

Ad ripas superiores fluvii Yarra-Dallachi.

Rami graciles elongati. *Phyllodia* læte viridia pleraque 3-4″ longa, 3-6‴ lata. *Capitula* suaveolentia.

58. ACACIA LEPROSA (*Sieb. in DC. Prod.* ii. p. 450, *var. sec. Benth.*—Acacia reclinata, *Ferd. Mueller, First Gen. Report*, p. 12). Elatior, ramulis angulatis subglabris demum nutantibus, phyllodiis chartaceis patentibus lineari-lanceolatis sphacelato-apiculatis vix curvatis subsessilibus ima basi minutim glanduligeris basi ut apice sensim angustatis glabris viscoso-punctatis uninerviis tenuiter reticulato-penniveniis, pedunculis axillaribus geminis ternisve capitulo sulphureo multifloro æquilongis puberulis, corolla glabra 5-fida calycem dentatum puberulum semisuperante, bracteolis lanceolatis, ...

In vallibus Australiæ Felicis orientalis et litoralis.

Frutex densus altus. *Phyllodia* pleraque 1¼–2¼″ longa, 2–3‴ lata. *Legumen* lineare falcatum arcuatum basi et apice acutum circiter 1–2-pollicare 1¼‴ latum compressum tenui-coriaceum fuscum inter semina continuum non contractum.

β. binervis, phyllodiis binerviis.

In collibus graniticis ad flumen Broken River.

A. leprosæ persimilis, vix tamen ejus varietas.

[I still think it a mere variety of *A. leprosa*.—G. B.]

59. Acacia dodonæifolia, *Willd. Enum. Pl. Suppl.* p. 68. (Acacia viscosa, *Schrad. in Wendl. Comment.* p. 30.—Mimosa dodonæifolia, *Persoon, Synops.* ii. p. 261.)

Ad sinum Spencer's Gulf prope Port Lincoln, *C. Wilhelmi*.

Corolla 5-partita calycem glabrum viscidum dentatum triente superans. *Bracteolæ* angustissime lineares, lamina spathulata terminatæ. *Pedunculi* solitarii v. gemini glabri capitulo longiores. *Legumina* dilute fulvida 1–4½″ longa, 1½‴ lata lato-linearia curvata viscidula satis compressa tenui-coriacea enervia intus continua inter semina haud aut vix contracta. *Semina* nitentia spadiceo-nigrescentia compresso-ovata 1½–2‴ longa, strophiolo sordide fulvido replicato basi suffulta. *Frutex* 15-20′.

Differt ab *A. reclinata* et *A. leprosa* phyllodiis distinctius venosis paulo crassioribus ratione longitudinis latioribus, obtusioribus, apiculo minuto non sphacelato terminatis prope et supra medium glanduligeris (præter glandulam basalem), pedunculis longioribus glabris sæpe solitariis, calyce glabro, corolla profundius divisa, bracteolarum forma et forsan quoque leguminibus hactenus mihi ignotis.

60. Acacia stricta, *W. Sp. Plant.* iv. p. 1052.

Kangaroo Island. Satis frequens in colonia Victoriæ.

β. binervis, phyllodiis binerviis. Tasmania, *Stuart*.

γ. pleiocephala, racemis brevibus oligocephalis.

South Port, Tasmaniæ, *Stuart*.

61. ACACIA PLAGIOPHYLLA, n. sp. Ramulis hirtellis angulatis, phyllodiis parvis glabris triangularibus sive ovato-deltoideis sessilibus

mucronatis curvato-uninerviis subaveniis marginatis ad angulum superum obtusiusculum glanduligeris, ...
Ad flumen Brisbane, No. 25, *Hill et Muell.*
Habitu ad *Acaciam pravissimam* accedens. *Phyllodia* 2–4''' longa, 1½–3''' lata, satis obscure viridia, nitidula. *Flores* et *fructus* hactenus ignoti.

[Without further information, it will be impossible to judge of or identify this species. There are no specimens sent.—G. B.]

§ 9. *Brachybotryæ.*

62. Acacia viscidula, *Benth. in Hook. Lond. Journ.* i. p. 363. no. 141. (Acacia elongata, *Benth. in Linnæa,* xxvi. p. 624, non *Sieber.*)
Spencer's Gulf, Lake Torrens, St. Vincent's Gulf, et Murray River.
Flores minuti. *Sepala* spathulato-linearia vix ciliolata corollam semiæquantia. *Legumina* lineari-filiformia acuta sessilia 1½–2½'' longa, circiter 1½''' lata fuscata longitudinaliter venosa coriacea leniter curvata, inter semina modice contracta. *Semina* nigro-fusca nitentia 1–1½''' longa ovata vix compressa areolata. *Strophiolum* crassiusculum lividum basin seminis tantum amplexans.
A. farinosæ affinis.

63. Acacia farinosa, *Lindley in Mitchell's Three Exped.* ii. p. 146.
Ad sinum Spencer's Gulf, *C. Wilhelmi.*
Frutex ramosissimus laxus paucipedalis. *Corollæ* profundè 5-partitæ segmenta lanceolata glabra. *Sepala* libera lineari-spathulata ciliolata petalis semisuperata. *Legumina* turgida glabra spadicea circiter 2'' longa, vix ultra 2''' lata, arcuata, basi obtusa sessilia, apice longe rostrata, inter semina constricta. *Semina* ovata 1½''' longa sordide brunnea, strophiolo flavescente crassiusculo bilobo ter breviore suffulta.

64. Acacia multinervia, *DC. Legum. Mem.* p. 445.
In vicinitate montis Alexander.
Flores minuti. *Capitula* nonnunquam terna. *Calyx* 5-fidus ciliolatus. Vidi in specimine meo ramos striato-angulatos puberulos. *Stipulæ* e lata basi lineari-setaceæ demum deciduæ.
Species situ glandulæ inter affines valde distincta.

[The true *A. multinervia*, DC., is probably one of the Pungentes, as I pointed out (Linnæa, xxvi. p. 625). The plant here alluded to by Dr. Mueller, among the Brachybotryæ, is probably the one I myself formerly mistook for the *A. multinervia,*—a variety of *A. ixiophylla* with a marginal gland. I have not, however, seen any specimen from Dr. Mueller.—G. B.]

65. Acacia translucens. *All. Cunn. in Hook. Icon. Plant.* ii. t. 160.

Ad rivos Sturt's Creek et Hooker's Creek Australiæ subcentralis et ad flumen Victoriæ in locis petræis, *Hb. Muell.* No. 8, 81, et 83.

Calyx corolla aliquoties brevior. *A. impressæ* inter Juliferas affinis.

66. Acacia impressa (*Ferd. Mueller*, non *Cunn.*). Breviter pubescens, ramulis angulatis, *stipulis semilanceolatis acuminatis diu persistentibus,* phyllodiis parvis ovatis v. ovato-lanceolatis apice obtusis cuspidato-apiculatis 3–5-nerviis anastomosanti-venosis juxta basin obscure glanduligeris, pedunculis axillaribus solitariis phyllodio paulo v. dimidio brevioribus (capitulis globosis v. subovatis), bracteolis lanceolatis longe acuminatis, calyce 5-partito ciliolato corolla 5-fida rigidula ter breviore, legumine fusco glutinoso pubescente oblongo-lineari compresso vix inter semina contracto et vix curvato intus continuo, *seminibus* ovatis *subfuscis utrinque insigniter impressis, strophiolo minuto* albido.

In rupibus ad flumen Victoria River, No. 82; Sturt's Creek, No. 8; inter Sturt's Creek et Victoria River, No. 83.

Frutex 8–12′. *Phyllodia* ⅔–1″ longa, 3–6‴ lata. *Corolla* 1‴ longa. *Legumina* biuncialia circiter 4‴ lata. *Semina* vix 2‴ longa.

[Very closely allied to the broad-leaved varieties of *A. translucens*, Cunn., scarcely differing except in the down which covers the branches, phyllodia, and pods. Dr. Mueller refers it to the Juliferæ; but the capitula are globular in most of the specimens, only slightly ovoid in the specimens numbered 82, which are almost past flower; and the pod is quite different from that of the *A. Wickhami* and its allies among Juliferæ.—G. B.]

67. Acacia homalophylla, *All. Cunn. ex Benth. in Hook. Lond. Journ. of Bot.* i. p. 365. no. 148.

Murray, Darling et Murrumbidgee River, Avoca, St. Vincent's Gulf, Spencer's Gulf, Lake Torrens.

Frutex interdum arborescens. *Capitula* brevissime pedunculata. *Sépala* angusta basi cohærentia subpuberula corollam semiæquantia. *Legumina* tortuosa coriacea extus nigrescentia 4–5″ longa, semunciam lata, acuta inter semina leniter contracta.

68. Acacia pendula, *All. Cunn. in Don, Gen. Syst.* ii. p. 404.

Sturt's Creek Australiæ subcentralis.

Specimina sine flore et fructu reperta satis dubia.

69. Acacia stenophylla, *All. Cunn. ex Benth. in Hook. Lond. Journ. of Bot.* i. p. 366. no. 151.

Ad flumen Murray prope originem fluvii Sturt's Creek Australiæ boreali-occidentalis.

Arbor minor. *Legumina* pallida stipitata compressa lignoso-coriacea

inter semina valde contracta, loculis vix ¼″ latis. *Semina* longitudinalia subolivacea ovata leviter compressa 2½‴ longa utrinque areolato-impressa. *Strophiolum* minutum fulvidum, funiculo recto.

Speciminum tropicorum legumina nondum vidi, conveniunt autem cum aliis ab equite Mitchell in Australia orientali extratropica collectis.

70. ACACIA EXCELSA (*Benth. in Mitch. Austr. Subtrop.* p. 225.—Acacia pterocarpa, *Ferd. Mueller, MSS.*). Arborescens, ramulis angulatis, phyllodiis falcato-lanceolatis subopacis tenui-coriaceis acutis sessilibus plurinerviis imperfecte reticulato-venosis supra basin minute glanduligeris, pedunculis axillaribus solitariis monocephalis phyllodio pluries brevioribus, *leguminibus* stipitatis subcoriaceis compressis oblongo-linearibus angustissime alatis inter semina plus minusve contractis *indehiscentibus, seminibus estrophiolatis* ovatis leviter compressis nitidulo-nigris, areolis non impressis.

In virgultis Brigalow Scrub circum planities Peak Downs, No. 36.

Arbor minor. *Cortex* nigrescens rugosus frustulosus. *Phyllodia* viridia 1½–2″ longa, 3–5‴ lata. *Pedunculi* circiter semunciales. *Flores* ignoti. *Legumina* bipollicaria v. breviora, circiter 3‴ lata, non distincte venosa. *Semina* 2‴ vix metientia.

A. multinerviæ et *A. excelsæ* finitima.

[Dr. Mueller's specimens are in fruit, Col. Mitchell's in flower; but they appear to belong to the same species. The phyllodia are precisely the same, so is the inflorescence; for in Dr. Mueller's specimen the peduncles are not always solitary. Col. Mitchell notes that it is a large forest tree, Dr. Mueller found it a small tree; but that might depend upon locality.—G. B.]

71. ACACIA HEMIGNOSTA, n. sp. Glabra, ramulis tenuibus junioribus angulatis, *phyllodiis* tenuicoriaceis subglaucis lanceolato-oblongis obtusis leviter curvatis in basin longe angustatis subtrinerviis *creberrime venulosis* supra basin minute glanduligeris, pedunculis tenuibus axillaribus monocephalis solitariis phyllodio pluries brevioribus v. terminalibus racemum constituentibus, capitulis parvis multifloris, sepalis paulo puberulis perangustis liberis corolla parum brevioribus, leguminibus dilute fuscis chartaceis elongato-oblongis complanatis marginatis stipitatis indistincte venosis ad suturas flexuosis, *seminibus rotundis* leviter compressis *estrophiolatis* conspicue circulariter areolatis opacis squalide fuscis.

Ad flumen Albert sinus Carpentariæ, No 34. Ad fluvium Victoriæ, No. 87. Gilbert River, Roper River.

Frutex v. arbuscula. *Phyllodia* 1½–4″ longa. *Racemi* terminales inferne non raro foliati. *Capitula* vix pisi magnitudine. *Legumina* 3-pollicaria vel breviora, 3–5‴ lata. *Semina* vix 2‴ metientia.

Huc probabiliter referenda est *Acacia* illa *hemignosta* ab illustri Bentham sub *Acacia melanoxylon* l. c. indicata olim ad sinum Cambridge

Gulf Australiæ boreali-occidentalis a beato Cunningham imperfecte collecta.

[Dr. Mueller is right in referring this to the plant gathered by A. Cunningham at Cambridge Gulf. It is very nearly allied to *M. melanoxylon*; but the flower-heads appear to be always solitary, on slender peduncles, and much smaller than in that species, and the pods more straight, broader, thinner, and shorter. The phyllodia are also usually more glaucous.—G. B.]

72. Acacia implexa, *Benth. in Hook. Lond. Journ. of Bot.* i. p. 368. no. 156.

Prope urbem Bathurst, *C. Moore.* Ad ripas fluviorum a portu Phillip usque ad flumen Snowy River. Ad montem MacIvor. In tractu Bacchus Marsh.

Arbor minor. *Cortex* nigricans ramosissimus. *Sepala* cuneata ciliolata demum superne secedentia. *Semina* fusco-nigra nitentia oblongo-ovata leniter compressa circiter 2‴ longa exareolata. *Strophiolum* lividum implexum basin seminis tantum ambiens.

73. Acacia complanata, *All. Cunn. ex Benth. in Hook. Lond. Journ. of Bot.* i. p. 369. no. 160.

Wide Bay, *C. Moore.* Brisbane River, *Hill et Mueller.*

β. fasciculata, pedunculis numerosis fasciculatis raro racemosis, No. 32.

Frutex altior. *Sepala* cuneato-linearia puberula corollæ dimidium superantia. *Legumina* stipitata compressa tripollicaria v. breviora, circiter 3‴ lata, marginata, inter semina plus minusve contracta.

§ 10. *Juliferæ.*

74. Acacia tenuissima, n. sp. Glabra, ramulis gracilibus subangulatis, phyllodiis tenui-filiformibus leniter compressis muticis striolatis, spicis brevibus axillaribus solitariis densifloris glabris, calyce membranaceo obtuse dentato, corolla 5-loba calycem triente superante, leguminibus . . . .

Ad rivum Sturt's Creek Australiæ subcentralis, No. 72.

Phyllodia 2–4″ longa. *Pedunculi* floriferi semunciales vel breviores. *Spicæ* circiter 4‴ longæ, floribus minutis.

A. filifoliæ Benth. proxima.

[A good species. The striæ of the phyllodia are like those of *A. aciphylla*, Benth.; but the phyllodia are very much more slender, and not pungent. The spikes when in bud are like those of *A. xylocarpa*, the angular corollas projecting considerably above the calyx.—G. B.]

75. Acacia pityoides, n. sp. Glabra, ramulis teretiusculis, phyllodiis compresso-filiformibus oblique apiculatis subtiliter v. indistincte striatis, spicis brevibus densis cylindraceis axillaribus solitariis gemi-

nisve breviter pedunculatis, floribus parvis glabris, sepalis tenerrimis liberis oblongis corolla triente brevioribus, leguminibus linearibus flexuosis pallidis chartaceis inter semina leviter contractis aveniis.

In virgultis Brigalow Scrub, a fluvio Gilbert usque ad flumen Suttor, No. 6. Ad rivum Sturt's Creek, No. 5.

Phyllodia opaca $1\frac{1}{2}$–4″ longa, $\frac{1}{3}$–$\frac{2}{3}$‴ lata. *Spicæ* vix unciales. *Legumen* circiter sesquipollicem longum, 1–$1\frac{1}{2}$‴ latum. *Semina* desunt.

A. aneuræ et *ephedroidi* propinquæ.

[A specimen of this species is amongst Cunningham's specimens of his *A. xylocarpa*, which it closely resembles; but the phyllodia are not broader than thick, and the corollas appear more membranous, projecting less in the young spike. The foliage is precisely that of the following species (*A. orthocarpa*); but the pod, which I have not seen, is differently described by Dr. Mueller.—G. B.]

76. ACACIA ORTHOCARPA (*F. Muller, MS.*). Glabra, ramulis teretiusculis, phyllodiis filiformibus estriatis oblique et obtuse apiculatis, spicis axillaribus subgeminis pedunculatis, leguminibus lignescentibus lanceolato-linearibus rectis acutis margine obtusis longitudinaliter venosis intus oblique transversim septatis.

In plagis dumoso-rupestribus ad ortum fluvii M'Arthur River, No. 4.

Phyllodia longitudine inter $1\frac{1}{2}$ et 4″ varia, circiter $\frac{1}{2}$‴ crassa, sulcis duobus indistincte percursa. *Legumina* circiter bipollicaria 3–4‴ lata in basin sensim attenuata.

Species *A. gonocarpæ* propinqua.

[Closely allied to *A. xylocarpa* Cunn., and *A. pityoides* F. Muell. With the foliage of the latter, the fruit is precisely that of the *A. xylocarpa*.—G.B.]

77. ACACIA GONOCARPA, n. sp. Ramulis tenuibus compresso-angulatis junioribus ramulisque viscidis, phyllodiis angusto-linearibus elongatis uninerviis recurvo-apiculatis basi glanduligeris, spicis brevibus densis axillaribus geminis v. solitariis breviter pedunculatis glabris, sepalis linearibus liberis corolla 5-fida duplo brevioribus, *legumine sublignoso ad suturas rectas contracto oblique septato, valvis dorso convexis utroque latere acute carinatis.*

In terra Arnhem's Land juxta partem austro-occidentalem sinus Carpentariæ in plagis rupestribus, No. 7.

Frutex pluripedalis. *Phyllodia* pleraque 2–3″ longa, circiter $\frac{1}{2}$‴ lata. *Spicæ* unciales v. breviores. *Legumina* 2–3″ longa, fusca, ad suturas tantum $1\frac{1}{2}$‴ lata sed inter angulos dorsi 3‴ metientia, basi et apice sensim attenuata striolata. *Semina* desunt.

Species quam maxime singularis ad quintam Juliferarum sectionem pertinens, ad *A. xylocarpam* quoque approximans.

[Those specimens which are in flower only, precisely resemble the flatter-leaved specimens of *A. xylocarpa*, Cunn.; but the pod, from Dr. Mueller's description, must be quite different.—G. B.]

78. ACACIA DREPANOCARPA, n. sp. Erecta, glabra, ramulis superne angulatis, phyllodiis brevissime petiolatis elongato-linearibus subrectis basi et apice longe angustatis hinc apiculatis supra basin glanduligeris uni- trinerviis crebre parallelo-venosis, spicis axillaribus solitariis brevissime pedunculatis, *leguminibus lignescentibus complanatis* subfalcatis intus oblique septatis margine planis integerrimis apice obtusis basi longe acutatis.

In rupibus plagæ austro-occidentalis sinus Carpentariæ, No. 27.

Frutex. *Phyllodia* iis *A. juliferæ* et *delibratæ* simillima, sed glandula a basi paulo remota. *Rachis* cylindracea circiter sesquipollicaris. *Flores* desunt. *Legumina* iis *A. loxocarpæ, oncinocarpæ* et *aulacocarpæ* similia, $1\frac{1}{2}$–3″ longa raro recta, margine (statu saltem immaturo) subcanaliculato-plana, extus oblique et fere parallelo-venosa.

A. loxocarpæ propinqua.

[Closely allied to *A. avida* Benth., and only appears to differ, as far as the specimens indicate, in the much narrower pods; but these are far from ripe in Dr. Mueller's specimen, and the only one on Cunningham's specimen is quite ripe and open.—G. B.]

79. ACACIA LYSIPHLOIA, n. sp. Subglabra, viscidula, ramulis angulatis, *phyllodiis* sessilibus (fere uncialibus) oblongis leviter curvatis cuspidatis 1–3-nerviis obscure parallelo-venosis *creberrime punctulatis* vix glanduligeris, *stipulis e lata basi lanceolato-subulatis diu persistentibus,* spicis brevibus axillaribus solitariis breviuscule pedunculatis densifloris cylindricis, sepalis angustis glabris corolla 5-partita triplo brevioribus.

Sturt's Creek, No. 84; Hooker's Creek, No. 86. In arenosis planitierum et vallium sinus Gulf of Carpentaria, e. g. ad ortum fluvii Limmen et Bight River, No. 3.

Arbuscula, coma planiuscula dilatata. *Cortex* exterior tenuis castaneofuscus in frustulis revolutis secedens. *Phyllodia* $\frac{3}{4}$–1″ longa, 1–$1\frac{1}{2}$‴ lata. *Spicæ* uncia sæpe breviores. *Legumina* ignota.

A. ptychophyllæ approximanda.

[Very near *A. linarioides,* Benth. The phyllodia are rather shorter and thicker and sometimes rather broader. The flowering spikes are closer and shorter, but they are younger; in the specimen No. 84, where they are more developed, they are nearly as long as in *A. linarioides.* If the pod (which is unknown) should not prove different, it must be considered as a mere shortened variety of *A. linarioides.*—G. B.]

80. Acacia linearis, *Sims, Bot. Mag.* t. 2156.

Satis frequens in vallibus silvaticis irriguis partis austro-orientalis coloniæ Victoriæ.

81. Acacia floribunda, *Willd. Sp. Pl.* iv. 1051.

Ad flumen Tamba terræ Gipp's Land.

Frutex 10–12′ altus.

82. Acacia mucronata, *Willd. Enum. Suppl.* p. 68.
In ericetis terræ Gipp's Land, prope flumen La Trobe River.

83. Acacia Sophoræ, *R. Br. in Hort. Kew.* ed. 3. p. 462.
Frequens ad litus arenosum coloniarum Victoriæ et South Australia.

β. *montana,* phyllodiis majoribus crassioribus distinctius venosis, ramulis spicisque viscidulis, legumine lato-lineari *compresso* (illo iconis Bill. non dissimili).

A. phlebophylla, *First Gen. Rep.* p. 12. In montibus altioribus graniticis (4000′ saltem elevatione) tractus Buffalo Range. Species forsan distincta.

84. ACACIA DALLACHIANA, n. sp. Arborescens, glabra, ramulis angulatis, phyllodiis falcato-lanceolatis breviter petiolatis opacis bi- vel trinerviis reticulato-venosis prope basin glanduligeris, spicis sessilibus axillaribus geminis cylindraceis densifloris, *corolla glabra quadrifida calycem ciliolatum triente superante,* germine glabro, leguminibus . . .

In montibus Buffalo Range.

Phyllodia illis *A. longifoliæ* persimilia utplurimum 3–4″ longa, 8–12‴ lata, in basin longius quam in apicem angustata. *Spicæ* 1–1½″ longæ odore inamœno, ante florum expansionem *bracteolis dense et pulchre squamatæ. Bracteolæ* peltatæ deltoideo- v. nephroideo-cordatæ obtusæ parce ciliolatæ vix ½‴ longæ. *Calyx* late campanulatus puberulus ad medium 4-fidus, lobis semiovatis, fere hyalinis. *Corolla* ochroleuca, laciniis deltoideis. *Stamina* sulphurea circiter 1½‴ longa, corollam triplo superantia.

[Of this I have seen no specimen.—G. B.]

85. ACACIA DELIBRATA (*All. Cunn. ex Benth. in Hook. Lond. Journ. of Bot.* i. p. 374. no. 177). Arborescens, ramulis angulatis glutinosis glabris v. velutinis, phyllodiis subsessilibus lineari-falcatis vel ensiformibus vel rarius abbreviatis angusto-oblongis oblique acuminatis v. cuspidato-apiculatis prominenter 1–3-nerviis glabris v. raro puberulis crebre parallelo-venosis ima basi glanduligeris, spicis brevibus axillaribus solitariis geminisve densis breviter pedunculatis, corolla 5-partita calycem dentatum ciliolatum semisuperante, *legumine* stipitato *chartaceo* angusto *oblongo compresso* marginato dilute fulvo margine undulato, seminibus lucenti-nigris compresso-ovatis strophiolo albido cymbiformi triplo longioribus utrinque insigniter impressis.

Arnhem's Land, No. 28. Head of Seven Emu River, No. 40. Upper Roper, No. 25. Moreton Bay, *Moore.* Fitzmaurice River, No. 91. Sturt's Creek, No. 92. Victoria River, No. 93.

Frutex 1–2-orgyalis. *Phyllodia* semipedalia v. breviora, raro tantum sesquipollicem longa, 1½–3‴ lata. *Spicæ* unciales v. breviores. *Legumina* 1–3″ longa circiter 4‴ lata, nitidula ad suturas non undulata. *Semina* sesquilineam longa. *Strophiolum* semel plicatum.

86. ACACIA OLIGONEURA (*Ferd. Mueller, MSS.*—Acacia delibrata, *All. Cunn. ex Benth. in Hook. Lond. Journ. of Bot.* i. p. 374, var.?). Glabra, ramulis gracilibus angulato-compressis, phyllodiis chartaceis subsessilibus elongatis angusto-lanceolatis acuminatis longe in apicem basinque angustatis leniter curvatis trinerviis reticulato-venosis basi glanduligeris, nervis juxta basin cum margine inferiore confluentibus, glandulis marginalibus nullis, spicis axillaribus solitariis vel fasciculatis brevibus cylindraceis glabris, pedunculis gracilibus, calyce laxo membranaceo dentato corolla ter breviore, leguminibus . . . . . .

In terra Arnhem's Land prope MacAdam's Range, No. 96; et Victoria River, No. 95.

Phyllodia pleraque 4–6″ longa, semunciam lata. *Spicæ* semunciales v. paulo longiores.

[The specimens Nos. 95 and 96 are in young seed, and Cunningham's are out of flower with a loose fruit; but as far as these materials admit of identification, they appear to belong to the same species: the phyllodia are, it is true, longer and not so coriaceous; but so they are in some of Cunningham's specimens. Dr. Mueller's specimen No. 91, from Fitzmaurice River, is exactly like one of Cunningham's, except with rather more coriaceous phyllodia; it is in good fruit, and the pod similar to Cunningham's. The specimens Nos. 71, 90 and 92 from Sturt's Creek, No. 25 from Roper, No. 40 from Seven Emu River, and No. 93 from Lower Victoria River, have still more coriaceous phyllodia, and, in the case of the two last, considerably shorter; but they probably all belong to one species.—G. B.]

87. ACACIA TORULOSA, n. sp. (Acacia julifera, *F. Muell. MSS.*, non *Benth.*). Arborescens, ramulis superne angulatis, phyllodiis breviter et crasse petiolatis elongato- v. lineari-falcatis oblique glanduloso-apiculatis v. cuspidatis prominenter 3–5-nerviis crebre parallelo-venosis glabris ima basi glanduligeris, spicis brevibus axillaribus terminalibusque solitariis geminis ternisve densis breviter pedunculatis, calycis profunde partiti segmentis angusto-spathulatis ciliatis puberulis corolla triente brevioribus, *legumine* flexuoso *toruloso marginato* acuminato stipitato *inter semina valde contracto.*

Sandy banks of the Nicholson, No. 26. Roper River, No. 23. Gulf of Carpentaria, No. 24.

Frutex elatior. *Phyllodia* et *spicæ* illis *A. delibratæ* similia. *Legumina* 2–4″ longa, matura non visa.

[This appears to me to be a good species; the pod is different from any one I am acquainted with in this section. It is not my *A. julifera*, which may perhaps be one of the numerous forms of *A. delibrata.* —G. B.]

88. ACACIA DORATOXYLON (*A. Cunn. in Field, N. S. Wales*, p. 345? —Acacia pachycarpa, n. sp., *F. Muell, MSS.*). Glabra, ramulis superne angulatis, phyllodiis brevissime petiolatis lanceolato- v. elon-

gato-linearibus plus minus falcatis recurvo-apiculatis subtrinerviis crebre et tenuissime parallelo-venosis, basi glanduligeris, spicis brevibus axillaribus terminalibusque solitariis geminisve densis breviuscule pedunculatis, *calyce 5-sinuato glabro corolla ter breviore, legumine pallide fusco crasso* elongato-oblongo flexuoso *indehiscente* toruloso marginato apice obtuso basi acuto *ad suturas fere recto, seminibus ovato-globosis opacis atris* subcompressis minutim albido-strophiolatis.

Ad rivum Sturt's Creek Australiæ subcentralis, No. 89.

Arbor, nisi fallor, elata. *Phyllodia* bipollicaria v. fere pedalia, circiter 3''' lata. *Corollæ* parvæ. *Legumina* $1\frac{1}{2}$–$2\frac{1}{2}$'' longa, vix semunciam lata. *Semina* circiter 2''' longa, altero latere sæpius valde convexa, altero magis applanata.

Species phyllodiis *Acaciæ drepanocarpæ, juliferæ et delibratæ* similis, legumine autem ample diversa.

[I can see nothing in the phyllodia and flower to distinguish this from the *A. doratoxylon*, A. Cunn., of which the fruit is unknown.—G. B.]

89. Acacia Leucadendron, *All. Cunn. ex Benth. in Hook. Lond. Journ. of Bot.* i. p. 374. no. 178.

In montibus Newcastle Range Australiæ orientalis tropicæ, No. 29.

90. ACACIA CONSPERSA, n. sp. Elatior, erecta, ramis teretibus rachibusque pubescentibus, phyllodiis sessilibus coriaceis parce pulverulentis angusto-lanceolatis tenuicuspidato-apiculatis uninerviis creberrime parallelo-venosis supra basin glanduligeris, spicis axillaribus subsessilibus, *leguminibus teretiusculis* leviter compressis coriaceis vix venosis intus continuis breviter stipitatis non marginatis, seminibus ovato-oblongis compressis nitenti-nigris strophiolo plicato albido aliquoties longioribus lateraliter conspicue areolatis.

In plaga arenoso-petræa prope ortum fluvii Roper et Limmen Bight River, No. 30.

Frutex 5–10'. *Phyllodia* $1\frac{1}{2}$–3'' longa, 3–4''' lata, furfure deciduo subtili conspersa. *Rachis* fructifera uncialis v. paulo longior. *Legumina* 2–4'' longa, sesquilineam lata dilute fusca extus canescentia. *Semina* sesquilinearia areolis oblongo-linearibus notata.

A. leptocarpæ proxima.

[Differs from *A. leptocarpa* in the pubescent stems, the phyllodia shorter, rather narrow, straighter, and more coriaceous, terminated sometimes by an almost pungent point, although occasionally obtuse or with a terminal gland. The pod is also thicker. It will require more complete specimens to determine how far these differences are specific. —G. B.]

91. Acacia Cunninghami, *Hook. Icon. Plant.* ii. p. 165. no. 180.

Moreton Bay, *Ferd. Mueller*. Clarence et Richmond River, *C. Moore*.

92. ACACIA GONOCLADA, n. sp. Erecta, ramulis robustis pruinosis compresso-triquetris, phyllodiis glabris subglaucis brevissime petiolatis

lanceolato-oblongis leviter curvatis apice obtusis *callo glanduligero terminatis* basi distincte glanduligeris bi- v. trinerviis parallelo-multi-venosis, spicis axillaribus solitariis geminisve brevibus cylindraceis breviter pedunculatis, calycibus quinquedentatis rachibusque velutinis, *petalis enerviis* glabris calycem semisuperantibus demum liberis obtusiusculis, leguminibus compressis marginatis......

Ad partes superiores fluvii Victoriæ et in terra Arnhem's Land in rupibus, No. 9.

Frutex paucipedalis strictus. *Phyllodia* 2½–4" longa, 4–6‴ lata, tenui-coriacea. *Spicæ* ½–1" longæ. *Calyces* semilineam paulo excedentes. *Legumina* matura deficiunt.

Species *A. calyculatæ* et *A. acradeniæ* (*A. umbellatæ*, Cunn.) proxima.

[Allied to *A. Cunninghamii*, and has the same remarkably angular branches; but the phyllodia are much shorter and straighter, and the young pods are different, although it evidently belongs to the same group.—G. B.]

93. Acacia amentifera, n. sp. Glabra, ramulis angustatis, *phyllodiis* parvis *fasciculatis* angusto-oblongis obliquis basi angustatis sessilibus apice recurvis brevissime rostellatis (enerviis v.) obscure 1–3-nerviis, glandula marginali venisque nullis, spicis densis axillaribus oblongo-cylindraceis solitariis sessilibus glabris, bracteolis lineari-subulatis stipitatis, petalis lanceolatis solutis *sepala lineari-filiformia libera* triente superantibus, leguminibus ......

Upper Victoria, No. 74.

Phyllodia 3–5‴ longa, ¾–1½‴ lata, exsiccatione rugulosa. *Spicæ* floriferæ 3–4‴ longæ. *Flores* 1‴ breviores. *Legumina* desunt.

Species distinctissima, *A. Wickhami* consocianda.

[A very distinct species. The phyllodia are small and fasciculate, as in *A. subternata* among *Brunioideæ*, shaped more like some of the narrow-leaved forms of *A. arcuata*, but much smaller, whilst the flowers show an affinity to *A. Wickhami*.—G. B.]

94. Acacia Wickhami, *Benth. in Hook. Lond. Journ. of Bot.* i. p. 377. no. 187.

Inter flumina Victoria River et Sturt's Creek, No. 85.

β. *viscidula*, ramulis innovationibusque subviscosis, phyllodiis late et oblique ovatis prominenter plurinerviis. Sturt's Creek.

Calyx glaber leniter sinuatus. *Legumina* non visa, et species igitur incerta.

95. Acacia Wickhami, specimen fructiferum? (Acacia calligera, *Muell. MS.*). Glabra, glaucescens, ramulis angulatis, phyllodiis parvis sessilibus oblique ovatis undulatis *callo glanduligero terminatis uninerviis* obscure venosis, spicis densis axillaribus solitariis breviter pedunculatis, legumine viscidulo duro plano oblique striato angusto-lanceolato ad marginem recto obtuso oblique septato.

Gulf of Carpentaria, No. 38.

Phyllodia tenuicoriacea 2–4‴ longa. *Rachis* fructifera fere 1″ longa. *Legumina* bipollicaria v. breviora. *Flores* et *semina* desunt.

[I can see nothing to distinguish this from *A. Wickhami*, except that the specimens are in fruit, all those hitherto described of *A. Wickhami* being in flower only.—G. B.]

96. Acacia ptychophylla, n. sp. Subglabra, viscidula, ramulis angulatis, phyllodiis coriaceis subsessilibus (fere uncialibus) oblongis obtusis vix curvatis subglanduloso-apiculatis prominenter paralleloque plurinerviis prope v. infra medium obscure glanduligeris, spicis axillaribus solitariis densis cylindraceis breviuscule pedunculatis, calyce 5-partito petalis duplo breviore laciniis obtusis......

Sturt's Creek, No. 3 et 80.

Phyllodia $\frac{3}{4}$–$1\frac{1}{2}$″ longa, 2–$2\frac{1}{2}$‴ lata striata. *Spicæ* floriferæ circiter unciales, pedunculo semunciali. *Legumina* incognita.

A. stigmatophyllæ congrua.

[Differs from *A. stigmatophylla* in its rather shorter thick coriaceous phyllodia, in the viscidity of the young shoots, and the thicker, denser spikes, with larger flowers.—G. B.]

97. Acacia umbellata (*A. Cunn., Benth. in Hook. Lond. Journ. of Bot.* i. p. 378.—Acacia acradenia, *F. Muell. MSS.*). Elatior, erecta, ramis superne compresso-angulatis, phyllodiis breviter petiolatis coriaceis oblique oblongo- v. ovato-lanceolatis marginatis *callo glanduligero terminatis* plurinerviis parallelo-multivenosis basi indistincte glanduligeris ramisque glabris, nervis prope basin marginis inferi confluentibus, spicis axillaribus et terminalibus solitariis geminis ternisve cylindraceis brevissime pedunculatis phyllodio brevioribus, bracteolis spathulatis unguiculatis, calycibus ad trientem 5-fidis rachibusque velutino-puberulis, corollæ 5-fidæ calycem semisuperantis laciniis acutis carinulatis rigidulis, leguminibus coriaceis teretiusculis leviter curvatis obtusis continuis, seminibus lucenti-nigris ovatis compressis strophiolo fulvido triplo breviore præditis.

Ad sinum Gulf of Carpentaria, No. 10. Seven Emu River. Ad originem fluminis Victoriæ in plagis sterilioribus, No. 6.

Rami juniores et innovationes sæpe visciduli. *Phyllodia* 2–3″ longa, $\frac{2}{3}$–1″ lata. *Spicæ* $1\frac{1}{2}$–2″ metientes. *Raches* glabrescentes. *Calyces* $\frac{1}{2}$‴ longi. *Legumina* circiter $1\frac{1}{2}$‴ longa, totidem lineas lata. *Semina* sesquilineam metientia.

Species Acacias juliferas et dimidiatas conjungens inter illas *A. stigmatophyllæ* proxima, inter dimidiatas venis numerosissimis parallelis nec anastomosantibus distinguenda.

[Cunningham's specimen is very bad, which accounts for the imperfect description which prevented Dr. Mueller from recognizing it. The name is also inappropriate, unless it referred to the character of the tree from which it was gathered.—G. B.]

98. ACACIA AULACOCARPA (*A. Cunn., Benth. in Hook. Lond. Journ. of Bot.* i. p. 379.—Acacia leptophleba, n. sp., *F. Mueller, MSS.*). Subglabra, ramulis compresso-angulosis, phyllodiis coriaceis oblongis subfalcatis brevissime petiolatis basi glanduligeris apice obtusis et glanduloso-apiculatis tenuiter trinerviis subtilissime crebroque longitudinaliter venosis, spicis axillaribus pedunculatis solitariis longiuscule cylindraceis, sepalis subliberis oblongis laxis membraneis corolla 5-fida dimidio brevioribus, leguminibus ......

Ad rivum Sturt's Creek, No. 97.

Phyllodia 1½–2½″ longa, 5–8‴ lata (in unico suppetente specimine). *Spicæ* circiter sesquiunciales. *Corollæ* vix 1‴ longæ. Species *A. gonocladæ* proxima.

[The specimens are small and in flower only; but they do not appear to me to be in any point distinguishable from the *A. aulacocarpa.*—G. B.]

99. Acacia aulacocarpa, *All. Cunn.*

β. *brevifolia* (F. Muell. MSS.), phyllodiis oblique ovatis 1–1½″ longis.

Suttor Desert, No. 39.

Legumen fuscum pollicare in stipitem semuncialem sensim contractum.

[Probably a distinct species: the pod is broader, narrowed into a much longer stipes than in Cunningham's specimens, which, however, are not ripe. The phyllodia are very much shorter.—G. B.]

100. Acacia crassocarpa, *A. Cunn. ex Benth. in Hook. Lond. Journ. of Bot.* i. p. 379. no. 194.

Point Pearce, No. 94. Victoria River, No. 95.

Paulo recedit a descriptione phyllodiis duplo minoribus. *Legumina* dilute fusca tantum ima basi angustata prominenter venosa, venis transversis plus minusve anastomosantibus. *Semina* obliquo-transverse sita, 2‴ longa *oblonga* nitentia olivaceo-nigrescentia, strophiolo vix 1‴ metiente livido prædita.

101. ACACIA MEGALANTHA, n. sp. Glabra, ramulis teretiusculis superne compressis, phyllodiis coriaceis brevissime petiolatis dimidiato-ovatis v. falcato-oblongis obtusiusculis prominenter bi- v. trinerviis crebre parallelo-venosis basi glanduligeris, spicis axillaribus solitariis pedunculatis, floribus magnis remotiusculis glabris subglutinosis, calyce arcto acute 5-dentato petalis crassis triplo breviore, legumine ......

In deserto Australiæ subcentralis ad rivum Sturt's Creek, No. 98.

Phyllodia 1½–3″ longa, ⅔–1″ lata. *Spicæ* circiter unciales læte luteæ. *Corollæ* sesquilineares.

Haud prætermittere volui speciem ut videtur raram *A. acradeniæ* propinquam, etiamsi e frustulis fructu destitutis pessime circumscribendam.

[Very distinct in the unusually large size of the individual flowers.—G. B.]

102. Acacia retinervis (*Benth. in Lond. Journ. Bot.* i. p. 379.—Acacia tumida, *F. Muell. MSS.*). Arborescens, glabra, ramulis teretiusculis, phyllodiis breviter petiolatis oblongo-falcatis basi acutis prominenter plurinerviis creberrime parallelo-venosis glaucescentibus glanduloso-apiculatis, glandula basali parva v. indistincta, spicis axillaribus solitariis geminis ternisve raro subpaniculatis tenuiter cylindraceis phyllodio multo brevioribus, pedunculo perbrevi pubescente, calyce profunde partito velutino corolla dimidio breviore, leguminibus subcylindraceis torulosis coriaceis arcuatis v. leniter curvatis fuscescentibus intus subcontinuis, seminibus nigrescentibus lucentibus ovatis leniter compressis utrinque conspicue areolatis strophiolo fulvido plicato pluries longioribus.

In locis rupestribus ad flumen Victoriæ, ad promontorium Point Pearce, No. 100. Ad rivum Sturt's Creek, No. 99.

Phyllodia 3–5" longa, 8–12"' lata. *Spicæ* circiter unciales læte luteæ. *Flores* parvi. *Legumina* breviter stipitata, $1\frac{1}{2}$–$2\frac{1}{2}$" longa, circiter 3"' lata, intus septis membranaceis imperfectis oblique percursa. *Semina* circiter 2"' longa, areola fuscescente.

A. Cunninghami et quoad legumina *A. acradeniæ* affinis.

[The anastomosing of the smaller veins can scarcely be seen without the help of a glass; and it is not so frequent in the broad-leaved as in the narrow-leaved specimens.—G. B.]

103. Acacia stipuligera, n. sp. Pubescens, ramulis teretibus, phyllodiis breviusculis oblique lanceolatis leviter curvatis sessilibus cuspidato-apiculatis prominenter bi- v. trinerviis creberrime anastomosanti-venosis supra basin glanduligeris, *stipulis scariosis deltoideis persistentibus,* spicis axillaribus geminis breviter pedunculatis dense cylindraceis, bracteolis lanceolatis unguiculatis acuminatis. . . . . .

Sandstone table-land with scrub at the head of the Victoria River, of Hooker's Creek, and Sturt's Creek.

Frutex 5–8'. *Phyllodia* 1–$1\frac{1}{2}$" longa, 3–8"' lata, tenuiter venosa. *Stipulæ* fuscæ circiter 1"' metientes. *Pedunculi* albo-velutini. Nec flores evolutos nec fructus vidi.

Species probabiliter cum *A. retinervi* concatenata.

[Appears to be a distinct species; but the specimen is very imperfect.—G. B.]

§ 11. *Dimidiatæ.*

104. Acacia latescens, *Benth. in Hook. Lond. Journ. of Bot.* i. p. 380.

γ. *grandifolia* (var. *dubia*) glabra phyllodiis chartaceis majoribus.

In collibus inter flumina Dawson et Burnett, No. 35.

Sepala cohærentia cuneato-linearia corollæ dimidium æquantia.

[The phyllodia are rather broader than in Cunningham's specimens, with more nerves; but they do not otherwise differ.—G. B.]

105. ACACIA PLATYCARPA, n. sp. Glaberrima, ramulis gracilibus flexuosis apice angulatis subpruinosis, phyllodiis glaucescentibus lanceolato-falcatis dimidiatis chartaceis in petiolum brevem angustatis apice obtusis bi- v. trinerviis crebre reticulato-venosis, nervis basin versus cum margine infero confluentibus, glandulis marginalibus duabus vel tribus, capitulis axillaribus solitariis longiuscule pedunculatis, leguminibus oblongis complanatis glaucis anguste alatis obtusis dense reticulato-venosis inter semina non contractis.

Ad sinum Gulf of Carpentaria, No. 8. Ad flumen Victoriæ.

Frutex arborescens. *Phyllodia* 3–4" longa, $\frac{1}{2}$–1" lata. *Pedunculi* circiter pollicares. *Legumina* 2$\frac{1}{2}$–4" longa, circiter 1" lata, prorsus matura ut flores ignota.

[The phyllodia are precisely those of the *A. sericata*, Cunn.; but the minute glaucous down is wanting, and the pods are thinner than the one I described, which I have not now before me to compare.—G. B.]

106. Acacia holosericea, *All. Cunn. in G. Don, Gen. Syst.* ii. p. 407, no. 201.

Ad flumen Victoriæ alibique in terra Arnhemica, No. 79.

β. *pubescens* spicis interdum geminis. In rupibus secus flumen Victoriæ. Ad flumen Roper.

Legumina coriacea cincinnata, extus dense pubescentia, intus continua glabra, inter semina vix contracta. *Semina* nigrescentia sesquilineam longa compressa ovata.

107. ACACIA LIMBATA, n. sp. Glaberrima, ramulis acutangulis glaucis, phyllodiis sessilibus subfalcato-oblongis breviter uncinato-cuspidatis subtrinerviis supra basin crebre reticulato-venosis glandula minuta præditis, nervis basin versus cum margine infero confluentibus, spicis axillaribus solitariis longiuscule pedunculatis, leguminibus duris complanatis angusto-lanceolatis margine crasso cinctis inter semina non contractis pleiospermis venulosis basi sensim angustatis.

In Australia boreali.

Phyllodia 1$\frac{1}{2}$–2$\frac{1}{2}$" longa, circiter $\frac{1}{2}$" lata. *Venæ* primariæ nervis parallelæ. *Pedunculi* fructiferi recti unciales v. paulo longiores. *Legumen* 1$\frac{1}{2}$-2" longum oblique subparallelo-venosum. *Semina* matura deficientia.

[I have not seen the specimens of this plant.—G. B.]

108. Acacia dimidiata, *Benth. in Hook. Lond. Journ. of Bot.* i. p. 381, no. 202.

North Australia, No. 11. M'Adam Range, No. 78. Victoria River.

Legumina usque ad 5" longa, vix 3''' lata. *Semina* subtetragono-ovata lucenti-nigra fere 3''' longa, strophiolo squalide fulvo fere triplo breviore cupulata.

β. *eriostachya*, petalis calycibusque tomentosis.

Victoria River, No. 77.

Variat quoque phyllodiis duplo minoribus subvelutinis, leguminibus viscidulis cano-velutinis.

[The variety β connects the *A. humifusa*, Cunn., with this species as a mere variety.—G. B.]

109. Acacia latifolia, *Benth. in Hook. Lond. Journ. of Bot.* i. p. 382, no. 204.

In plagis elevatis petræis prope originem fluvii Limmen Bight River terræ Arnhemicæ et ad sinum Carpentariæ.

Frutex pauci- pluripedalis. *Legumina* compressa lato-linearia leviter curvata v. arcuata glabra marginata imperfecte venosa inter semina vix aut leniter contracta pleiosperma 1½–2½" longa, circiter 2½''' lata. *Semina* matura ignota.

Variat phyllodiis conspicue minoribus.

Series II. *Botrycephalæ.*

110. Acacia polybotrya, *Benth. in Hook. Lond. Journ. of Bot.* i. p. 384, no. 209.

Burnett River.

Variat paribus foliolorum usque ad xxv.

111. Acacia decurrens, *Willd.*

Ad flumen Snowy River.

Series III. *Pulchellæ.*

112. Acacia Mitchelli, *Benth.*

Glenelg River. Portland Bay.

113. Acacia basaltica, n. sp. Fruticosa, inermis, ramulis teretiusculis petiolis pedunculisque fusco-subvelutinis v. puberulis, stipulis imperfectis, pinnis 1–3-jugis, glandulis jugalibus minutis rotundis sessilibus, petiolari nullo, foliolis 5–10-jugis oblongo-ovatis puberulis obtusis muticis uninerviis subtus pallidioribus, pedunculis axillaribus solitariis monocephalis folio brevioribus v. subæquilongis, capitulo globoso, calyce breviter dentato corollaque parce puberulis, hac illum dimidio excedente ad trientem divisa, legumine angusto-oblongo venoso breviter stipitato compresso puberulo margine parum flexuoso.

In virgultis planitierum basalticarum Peak Downs, No. 42.

Epidermis ramorum membranacea secedens. *Foliola* 1½–3''' longa. *Pedunculi* crassiusculi subangulati, sæpius supra medium bractea minuta prædit. *Legumen* fuscum circiter 3" longum, ½" latum venosum. *Semina* matura desunt.

[A very distinct species, which may be placed next to *A. nigricans* and *A. Mitchelli.*—G. B]

Series IV. *Gummiferæ.*

114. ACACIA LENTICELLATA (*F. Muell. MS.*—Acacia Farnesiana, *Willd., Benth. in Hook. Lond. Journ. of Bot.* i. p. 494). Fruticosa, ramulis flexuosis glabris crebre lenticulatis vix angulatis, spinis tenuibus rectis, pinnis 1–3-jugis, petiolis rachibus foliolisque ciliolatis, glandula scutellari paris inferi manifesta, paris superi minima v. nulla, rachi decidue mucronata, foliolis 8–16-jugis oblongis v. oblongo-linearibus uninerviis, pedunculis axillaribus solitariis velutinis folio brevioribus apice bracteatis, capitulo globoso, corolla glabra ad quadrantem divisa calycem ciliolatum semisuperante, legumine oblique oblongo-cylindrico turgido spadiceo loculato glabro indehiscente, seminibus horizontalibus ovatis fuscis opacis.

Ad ripas, circum lacunas et in locis tempore pluviali inundatis Australiæ borealis centralis et intratropico-orientalis.

A. Farnesiana, *Leich. Overland Exped.*; *Benth. in Mitch. Trop. Austr.* p. 256; *Ferd. Mueller collect.*; an *Willd.*?

Frutex amplus elatior. *Foliola* pleraque $1\frac{1}{2}$–$2\frac{1}{2}'''$ longa. *Legumen* $1\frac{1}{2}$–$2\frac{1}{2}''$ longum. *Semina* fere 3''' metientia.

[The fewer pinnæ and pubescent peduncles in the Australian specimens induced me formerly to doubt whether they really belonged to the *A. Farnesiana*, especially as I had not then seen the fruit, and the specimens generally were bad. But I have since seen both East Indian and South American specimens agreeing precisely with the Australian form, and passing gradually into the commoner Tropical varieties.—G. B.]

115. ACACIA PALLIDA (*F. Muell.*, non *Willd.* quæ *Prosopis* species). Arborea, glabra, ramulis parum angulatis, spinis crassis curvato-divergentibus interdum abolescentibus, pinnis pauci- novem-jugis, glandula scutellari inter paria infimum et supremum ovata, foliolis 8–22-jugis oblongis obtusis glaucis venulosis uninerviis, pedunculis axillaribus solitariis monocephalis folio brevioribus angulatis medio bracteatis, capitulo globoso glabro, corolla ad quadrantem divisa calycem argute dentatum fere triplo excedente, legumine angusto-oblongo basi attenuato satis compresso recto lævi enervi, seminibus verticalibus dilute fuscis quadrato-ovatis.

In locis minus fertilibus præsertim campis apricis Australiæ intratropicæ non rara, No. 76.

Arbor minor, cortice suberoso sordide cano rugoso et rimoso. *Spinæ* 2-3''' longæ basi valde incrassatæ. *Foliola* $1\frac{1}{2}$–3''' longa, $\frac{1}{2}$–$1\frac{1}{2}'''$ lata. *Capitula* majuscula. *Legumina* 2–4'' longa, circiter $\frac{1}{2}''$ lata. *Semina* 3–4''' longa nitoris expertia.

A. suberosæ propinqua.

[The specimens marked 76, from Victoria River, are nearly allied to *A. Bidwelli*, but differ in the longer leaflets, the shorter pods, and

some other points. The proper place of *A. Bidwelli* is probably also among *Gummiferæ.* I had only seen it in fruit, when the real inflorescence is not always very certain; and I doubted whether the capitula were not sometimes racemose: but most probably they are (as in *A. pallida*) solitary, with the bract in the middle of the peduncle, the scar of which has sometimes the appearance of the scar of of a pedicel. Dr. Mueller's specimens, No. 76, are also without spines, and have much more numerous pinnæ than he describes (15 to 20 pairs with leaflets barely 2 lines long). These are, like Bidwell's, in fruit only. There is, however, a flowering specimen of Dr. Mueller's marked 75, from M'Adam's Range, which answers better to his character, and has the stipular spines of *Gummiferæ.* In it the pinnæ vary from 3 to 11 pairs, and the leaflets are 3 to 4 lines long. These clearly indicate the affinity of the species with *A. suberosa,* from which it differs in the usually numerous pinnæ and the broader pod. It remains to be proved whether it be specifically distinct from *A. Bidwelli,* which has the leaflets seldom 1 line long, and the pod, although unripe, already above 4 inches, and marked with veins, which may possibly disappear when the pod is ripe. —G. B.]

Contributions to Organographic Botany. By CHRISTOPHER DRESSER, Esq. Communicated by the Secretary.

[Read April 1st, 1858.]

[Abstract.]

MR. DRESSER passes successively under review the scales of the leaf-buds, the bracts, the sepals, the petals, the stamens, and the carpels of plants, with the view of showing that they are not, as usually considered, metamorphosed leaves, but metamorphosed leaf-stalks or petioles.

In support of this view, in relation to the development of leaf-buds, he enters into a detail of the structure of the Horse-chestnut, the Sycamore, the Walnut, the Cherry, the Currant, &c., but admits that in some instances, the Holly for example, the scales are more obviously analogous to the lamina of the leaf. With regard to bracts he instances *Angelica officinalis* and *Salvia fulgens*, in the latter of which he particularly calls attention to certain monster bracts and their venations, as affording clear evidence of their petiolar origin. The cases adduced in proof of a similar origin in the calycine leaves are, first, the abnormal development of one of the sepals in *Mussænda*; secondly, the frequent greater or less development of foliola upon the margins of the sepal in roses, which sepal consequently is to be regarded as equivalent to the

common petiole of the ordinary leaves of the plant; thirdly, the monstrous calyces of the Primrose, figured in Dr. Lindley's 'Elements of Botany' (figs. 147 and 148), in which laminæ corresponding with those of the leaves are seen to be developed on the apices of the united sepals; and lastly, the analogy of the ascidia of the Pitcher-plant, which are acknowledged to be petioles and not laminæ, with the calyx of the Lavender, in which one of the sepals developes a lamina or lid, which is slightly articulated with the tube of the gamosepalous calyx. In relation to sepals, however, Mr. Dresser thinks it highly improbable that those plants which have sessile leaves should produce petiolar calyces, but believes that the sepals may in these instances be derived either from the true lamina, or from a modification of its midrib. He applies the same reasoning to the origin of the petals; but although admitting the petals to be in some instances representatives of the laminæ of the leaves, he thinks it contrary to reason to suppose that this is really their mode of formation in some of those instances in which the petiole and the lamina of the leaf are thought to be most conspicuously manifested in the unguis and limbus of the petal. Thus, for instance, in the Sweet William and the common Pink, in which these two subdivisions of the petal are most distinct, the ordinary leaves are all sessile. His conclusion is, that therefore "on those plants which have sessile leaves we may look for petals formed of the lamina of the leaf or of its midrib, and on those with petiolar leaves for those formed of the petiole."

With regard to stamens, in which the filament is usually regarded as representing the unguis of the petal and the petiole of the leaf, and the anther as analogous to the limb of the petal and the lamina of the leaf, he thinks there exists no good ground for such a supposition. In the transformation of the stamen of the Rose there is no trace to be found of such a distinct origin of its parts; the stamen of the Poppy, in passing into the petaloid condition, is wholly transformed into an exunguiculate petal; and in *Tradescantia Virginica* the anther is evidently a modification of a portion of a petal only, while another portion is transformed into the filament. It is evident therefore, Mr. Dresser thinks, that where petals are petiolar bodies, the entire stamen owes its origin to the petiole alone. So also in relation to carpels, he entirely dissents from the opinion that they are derived from the laminæ of the leaves and that the ovules bear the same relation to them as the buds on the margins of the leaves of *Bryophyllum* to the leaves of that plant. The monster carpels of the Columbine, figured

in Dr. Lindley's 'Elements' (fig. 180), he regards as offering a clear indication in their venation of their petiolar origin, and their ovules metamorphosed into leaflets as bearing the same relation to the carpels as the leaflets of a compound leaf to the common petiole from which they arise. This view of the relation of ovules to carpels leads him to propose the following theory of their origin; viz. "that ovules are a metamorphosed state of the leaflets of compound leaves, or of the lobes or parts of simple leaves;" and he concludes his Paper by some observations in which this theory is developed more at length.

Letters on the Vegetation of West Equinoctial Africa. From Dr. FREDERICK WELWITSCH, addressed to W. W. SAUNDERS, Esq., V.P.L.S.

[Read July 1st, 1858.]

S. Paulo de Loanda,
12 Sept., 1857.

MY HIGHLY ESTEEMED FRIEND,—A few days since, I returned from the interior suffering from fever, which for five weeks has daily attacked me. I cannot, however, refrain from sending you a hasty sketch of the extent and success of my botanical rambles in the interior of this wonderful country, with best wishes that these lines may find you and my other London friends in good health.

During the first year of my residence in this country, I endeavoured to investigate the botanical treasures of the coast territory from the Quizembo River north of Ambriz as far as the mouth of the Coanza, which I very nearly succeeded in doing. In October 1854 I ascended by degrees over the lower mountains, which were mostly covered only with *frutices*, to the dark shady region of the mountain forests of Cazenojo and Golungo Alto, where I stayed nearly two years. Everything that reminds you of the flora of the coast and of the lower mountains disappears suddenly as if by magic in this region, whose highest mountain-peaks rise more than 2000 feet. Above 300 different species of trees and more than 400 kinds of climbing plants, closely entwined, form here a most magnificent primeval forest, whose ground is luxuriantly overgrown by more than sixty species of ferns, partly of arborescent forms. Amongst other most remarkable trees I found a *Napoleona* (ramis verticillatis), a *Myristacacea* (a noble tree 80 to 100 feet high), twenty-eight species of *Ficus*, some gigantic specimens of a *Na-*

thusia (foliis simplicibus), and also a multitude of species, almost all large trees, of the families *Hypericaceæ*, *Rubiaceæ*, *Bignoniaceæ*, *Verbenaceæ*, *Leguminosæ*, *Mimoseæ*, &c. But what particularly delighted me was the discovery of *Monodora Myristica*, already supposed to be native here by R. Brown, which is a native of all the primeval forests of these districts, and which represents one of the most gigantic and certainly one of the most splendid forest trees of the whole of tropical Africa. Later I found at Pungo Andongo, a second species, specifically different in the leaves and fruit, which I have named *Monodora Angolensis*. I will send many fresh seeds of both to England.

Terrestrial and parasitical Orchids are pretty tolerably abundant. Among the former there is one remarkable species, probably of the genus *Lissochilus*, distinguished by broad leaves nearly 5 feet long; a flower-stem 10 feet to 12 feet high; and particularly by a spike of blossoms often 1½-foot long, bearing twenty to twenty-five large rose-coloured flowers. This is probably the largest and most magnificent of all terrestrial Orchids hitherto discovered. Of this species I have roots ready to be sent to London at the first direct opportunity which offers. To show the gigantic dimensions of this species, I shall send you the dried flower-stem. Generally speaking, the whole vegetation of Golungo Alto has a truly gigantic character, so that there is no room left for the growth of smaller plants, especially annuals, with the exception of some *Gramineæ* and *Cyperaceæ*. An Umbellifer, whose leaves at the same time form one of the most famous remedies of the negroes, occurs in the form of a large tree of 1 foot to 1½ foot in diameter, used as timber; likewise, among the numerous and in most instances woody *Compositæ*, there occur two species as strong lofty trees. Almost all the *Artocarpeæ* which are found here will form quite new and very remarkable genera, but at the same time will show in the clearest light the transition of this family into the *Moreæ* on one side, and the *Urticeæ* on the other. A genus nearly allied to *Dorstenia* grows as a large woody shrub 4 feet high, in general habit like a Fig; but the receptacles are obconic, truncate, and open, just as in *Kosaria*. Also among the *Sapindaceæ* and *Combretaceæ*, and especially among the *Leguminosæ*, many highly interesting new genera are to be found.

The most interesting fact in Phytogeography will be that I have found here a *Begonia*, a *Hypoxis*, an *Ottelia*, a *Gnetacea*, a *Balsaminea*, and two *Cedreleæ*—all families of plants which have not before been met with in tropical Africa. A still more

interesting fact in geographical botany, which has come to my notice, is that a pendent parasitical *Rhipsalis*, often 6 feet to 8 feet long, occurs here, growing abundantly in the elevated woods of this country, particularly luxuriating on *Adansonia* and *Sterculia*, which consequently proves that *Cacti* are not restricted to America, as has hitherto been asserted. I will send living specimens also of this *Rhipsalis*, which I call *Rh. Æthiopica*, to you and Sir William Hooker.

In the whole, I believe I have collected in this wood-region 2000 species of plants, of which I have tried to describe the most remarkable genera, chiefly from living specimens. Farewell.

DR. FRIEDRICH WELWITSCH.

A *Polygalea* occurs as a climber 20 feet to 50 feet high, ⅔ foot in diameter. I believe it to be a *Lophostylis*, Hochst.

S. Paulo de Loanda, 10th Feb. 1858.

HIGHLY ESTEEMED SIR AND FRIEND,—When I was about to communicate to you last September a preliminary report on some of the results of my journey in the interior of Equinoctial Africa, I was prevented by a long illness from completing my letter, but send it now with these lines, as it contains something important about the vegetation of Golungo Alto and the adjacent mountain district. As I now feel rather better, I take the liberty of continuing today the letter I had then commenced. In the first place, I beg to remark that I have penetrated, in a direct line, about 250 geographical miles into the interior; and I divide the territories I have visited into three regions:—1. Littoral and lower mountain region; 2. Region of the primeval dense forest woods (*Regio montoso-sylvatica*); and, lastly, 3. The flat woody region (*Regio plano-sylvatica*). The first region rises to about 1000 feet, the second to about 2500, the third about 3300 feet. I have taken the measurement of the heights of these regions, but have not yet made an exact computation of the results, and therefore note the heights as given above only as temporary. These three regions extend from west to east in such a way that the first stretches towards the east as far as 80 geographical miles, the second to about 160, and the third to somewhere about 250. Regarding the vegetation of the littoral region, which is almost the same from Sierra Leone to the mouth of the Cuanza, there have been many important facts already published in the 'Niger Flora' of Sir W. Hooker. With regard to the second region,

which comprises the districts of Golungo Alto and Cazengo, together with Dembos, and partly also Ambaca, I have reported cursorily in my letter of the 12th September, 1857, and consequently I have only to tell you something about the third and most interesting region. Pungo Andongo (more correctly "Pungo ià N'dongo") forms the centre of this region, which, as you will quickly perceive from the little I am going to tell about it, forms an African district of vegetation of its own, which I shall call the kingdom of the Equinoctial African highlands. About fifteen to twenty geographical miles from Golungo Alto towards the east, the majestic dark shady woods of this district, which are so difficult to penetrate on account of the immense climbers, disappear; the forests in general become more rare and less dense, and are mostly formed by low trees, among which the most common is a new genus of *Araliaceæ*, with a most curious habit. The ground everywhere is now less shaded, on which account a greater number of smaller kinds of plants occur, especially *Convolvulaceæ* and splendid *Acanthaceæ*. New forms, never seen in the primeval forests of the second region, now make their appearance, among which are, especially, *Amorphophallus*, a magnificent climbing *Bauhinia*, small pretty *Compositæ*, the *Ancylanthus rubiginosus*, Desf., and an extremely pretty fruticose *Rubiacea*, which at first sight looks exactly like an *Azalea*!! Where the ground changes to mountains or higher hills, there occur *Sterculiea* foliis glaucis, *Nathusia* foliis indivisis (which have not appeared before), and a considerable number of *Compositæ*, all more or less related to *Sonchus*, as well as a few species of *Helichrysum*, which remind you already of the Cape flora. There now become mixed with the forest trees *Büttneriaceæ* with bunches of large white flowers; pretty *Rubiaceæ* and *Tiliaceæ* (among others an herbaceous *Grewia*) are more and more frequent; and a kind of *Thesium* (*Santalaceæ*) tells again of the Cape flora: but, far surpassing all other herbaceous plants, in splendour, size, and richness of blossoms, appears prominently in all the less dense places of the wood a *Sesamum*, which, as I have collected many seeds of it, will soon become an ornament of European gardens. As we approach the rocky scenery of the præsidia of Pungo Andongo, the forests of *Araliaceæ* occur alternately with forests of *Pterocarpus*; and all at once quite a new world of plants, a new geographical kingdom, starts before the eye. The ground is everywhere rocky, grown over with short grasses and *Cyperaceæ*; but in the many narrow ravines the most luxuriant forest-vegetation

abounds, consisting chiefly of *Leguminosæ*; *Ficus*; three species of *Nathusia*; *Apocyneæ*, forming trees with large blossoms; *Mimoseæ*, sometimes as trees, sometimes as climbers; several Asiatic *Rubiaceæ* in the form of trees (e.g. *Hymenodictyon*, Wallich); and a stately new *Monodora* (*M. angolensis*, mihi). At the foot of the rocks, and along the many little brooks, grow seven species of *Ophioglossum*, three *Schizææ*, and many Ferns, partly gold-dusted, and a magnificent tree-fern. Under these woody ferns (*Cyathea*, spec.) are found four or five *Umbelliferæ* and several curious *Rubiaceæ*. On the almost naked rocks grow fleshy *Euphorbiaceæ*; about ten species of *Commelyneæ*, with the habits of *Mesembryanthemum*, besides beautiful *Portulaceæ*, *Tillææ* (!), *Cyperacea leucocephala*; and in the brooks themselves two species of *Podostomeæ*, together with pretty *Batrachospermeæ* and *Zygnemata*. In stagnant water appear *Ottelia*, *Nymphæa*, and two *Aponogetoneæ* with blue blossoms, probably new genera. In wet meadows there occur six species of *Utricularia*, a *Drosera*, several *Campanulaceæ* (*Lightfootia*), an *Isoëtes* (*terrestris*), and a great number of small *Scrophulariaceæ* and *Leguminosæ*, as well as a kind of *Erigeron*. But now, on the steep walls of the higher rocks, what sort of viscid shrubs with scaly stems and blue flowers do we perceive? Two species of *Vellosieæ*! which, in conjunction with several fruticose Orchids that grow even on the barest rocks, cover all the mountains of Pungo Andongo. However, the before-named plants are not the only American guests of this territory. As soon as one approaches the summits (*juga altiora rupium*) of the rocky mountains, one finds the sides of the top overgrown with *Heurnia* and *Sarcostemma* (which announce the Cape of Good Hope), together with a *Cactus*, which is a RHIPSALIS; whilst on rough places there appear a *Musa* (scapo ventricoso! sæpius diametr. 5–6-ped.), a *Diploclinium* (*Begoniaceæ*) and *Erythroxylum*, spec.

But notwithstanding these curiosities, so frequently paradoxical, the splendour and variety of the flora of Pungo Andongo is not nearly exhausted. About a hundred species of pretty *Cyperaceæ* (*Cyperus*, fifty spec.), and above a hundred *Gramineæ*, in connexion with very pretty *Polygalaceæ* and *Ampelideæ*, adorn the lower plains; and whilst from the coast up to the boundary of this region I scarcely met with ten *Liliaceæ*, I was surprised to find around Pungo Andongo more than fifty species! Four spec. *Hypoxis*, above twenty-five *Orchideæ* (among them a *Disa*!) and *Commelynaceæ* occur in such abundance, that the whole of large

regions appears at one time pink, at another time sky-blue. A large *Kniphofia*, of 6 to 8 feet, is the queen of the lilies, whilst several new genera allied to *Anthericum* and *Scilla*, together with *Chlorophytum*, *Sanseviera*, and pretty *Asparagineæ*, form as it were the underwood of the lilies. One *Tacca* and two *Hæmanthi*, together with *Crinum* and a small-flowered *Narcissea*, adorn the skirts of the forests, besides a countless number of little *Rubiaceæ*, with sky-blue or rose-coloured flowers. Species of *Hibiscus* appear everywhere. The *Violariæ* are represented by three *Ceranthera* in the form of small trees (one with the habit of *Ilex aquifolium*!). A *Myricacea*, with an extremely delicious powerful smell, forms quite a new genus, which is only related to *Comptonia* in the formation of the anthers; but it has, like no other *Myricacea*, opposite leaves. I have described it as *Myrothamnus flabellifolius*. *Pistia* and *Ceratophyllum*, with an *Azolla* and a *Marsileacea*, abound in the fresh water with *Polygonaceæ* and *Scirpoideæ*, accompanied almost everywhere by two or three species of *Nymphæa* (*Nymphæa Lotus*, P. de B.), whilst a *Ruppia* (similar to *R. maritima*) and several *Charæ* fill the stagnant water. Among the climbers are two species of *Hugonia*, a 5-gonous *Mimosa*, and several species of *Strophanthus*. Among others *Asclepiadeæ* are also numerous, and mostly climbers. Also an *Oleacea* occurs as a large tree; and tree-like *Euphorbiaceæ* (*Bridelia*, &c.) are found everywhere. The *Daphnoideæ* are represented by a very pretty scarlet *Gnidia*, the *Proteaceæ* by two thickheaded *Proteæ*. *Labiatæ* and *Verbenaceæ* are in great abundance everywhere; the latter and several *Acanthaceæ* mostly assume the forms of trees or shrubs. *Loranthaceæ* glitter frequently from out the dark-leaved tops of the *Combretaceæ* and *Anonaceæ*; but they occur also on *Mimoseæ*, and (in spite of De Candolle's assertion) very frequently on fig trees, even on the cultivated *Ficus Carica*. *Celastrinæ*, *Hippocrateaceæ*, and *Chailletieæ* are not numerous. Of *Myrtaceæ* were observed ten, of *Melastomeæ* only thirteen species, of *Connaraceæ* eight, of *Lythraceæ* ten or twelve species, of *Ranunculaceæ* I have five species of *Clematis*; of *Rosaceæ* I have found only one *Rubus* (*apetalus*). A *Cochlospermum*, as a tolerably large tree, is to be met with everywhere; besides, I have to enumerate five *Piperaceæ* and two *Dorstenieæ*, among which occurs a *Kosaria*. These all appear to be new species. The *Scrophulariaceæ*, of which there are about thirty species, principally adorn the meadows where they grow, with four species of *Eriospermum* (*Liliaceæ*), with several species

of *Anthericaceæ*, *Drosera*, *Disa*, *Corchorus*, and *Triumfetta*. I have also found in the marshes quite a new and highly interesting Monocotyledonous family represented by five species, which in its characters somewhat resembles *Centrolepidæ*. I am firmly convinced that this new family will be received by all phytologists as quite original, and will be considered as a contribution to the filling up of the vacancies which exist to this day between the true *Cyperaceæ* and the *Enantioblastæ*. Not less variety is found in the Cryptogamic Flora of Pungo Andongo, among which particularly the *Fungi* are remarkable. *Polyporoideæ*, *Agaricoideæ*, and *Sphæriaceæ* are extremely numerous, in beautiful forms and bright colours. I have observed about 300 species; and of most of them I have collected illustrative specimens, which now all lie safely in my English Herbarium. Among the *Algæ* are especially to be noticed many sorts of *Scytonema*, which here compose, as the *Sphagna* do in Europe, the swampy ground for the so-called peat plants (*plantæ turfosæ*), and in whose thickly-matted turf *Droseræ*, *Utriculariæ*, a kind of *Xyris*, and many *Hepaticæ* and *Musci* usually take root. Of *Musci* there were in all about eighty species, of *Lichenes* above a hundred; of *Filices*, on the whole and including the insulares, nearly a hundred species, among which are two *Filices arboreæ*, two *Platyceria*, two *Lygodia*, three *Hymenophylla*, one *Marattia*, one *Gleichenia*, &c. There are rarely met with more than six kinds of *Lycopodia*, for the most part extremely pretty *Selaginellæ*. I must also remark, with regard to the *Algæ*, that two *Rhodophyceæ*, namely, two *Hildenbrantiæ*, are found in the brooks between Golungo Alto and Pungo Andongo, and indeed in such abundance, that certain parts of the brooks assume a blood-colour or purple dye.

The haste with which I have been compelled to compile this letter will be in some degree an excuse for the confusion which would necessarily follow in enumerating the different families, as I have mentioned them only just as they presented themselves one by one to my memory. However, I permit myself to express the hope that this enumeration, although rather confused, will at least be sufficient to give a general idea of the riches and variety of the flora of the interior of Africa. As soon as I have put my herbarium in better order, and have arranged, in a preliminary way, those plants which can only be determined in Europe, I intend to give a general summary of all the plants which I have observed on the continent and the adjacent islands, together with indications relative to their propagation and distribution. As regards

the collection of insects I have made in Africa (among which the *Coleoptera* especially are very numerous, and also the *Hymenoptera* not unfrequent), I have communicated to Mr. S. Stevens some general remarks. With regard to the wishes of Mr. D. Hanbury, I may remark that I have collected about eighteen species of *Scitamineæ*; but from want of time I have made no drawings of their flowers, for I am a very bad and slow draughtsman: however, most of the species are very tolerably preserved, even as regards the flowers and fruit. Pray remember me kindly to Sir W. Hooker and R. Brown. I have been much pleased to find, even in the place itself, almost all the prophecies confirmed which R. Brown pronounced in his celebrated Appendix to Tuckey's Travels: this appendix was my gospel. It is very true, that I could have worked more effectually during my long stay in equinoctial Africa, if I had not had to fight again and again with fever, scurvy, and dysentery, which is in some degree but natural; for I had to penetrate the densest woods, to examine the deepest ravines, and to wander for miles slowly under a burning sun through marshy land, whilst common travellers are moved along, lying comfortably in hammocks, only on roads. (Sapienti sat!)

With the assurance of my greatest esteem and gratitude, I remain your most obedient,

DR. FRIEDRICH WELWITSCH.

Dennisonia, Barklya, et *Laboucheria*; genera floræ Australiæ nondum cognita. Descripsit Dr. FERD. MUELLER, S.L.S., etc.

[Read Jan. 20, 1859.]

DENNISONIA, n. g. VERBENACEARUM.

Calyx subcampanulatus, quinquefidus. *Corolla bilabiata*; labio supero breviore bifido; labii inferi tripartiti lacinia media majore; tubo cylindraceo subincluso intus barbato. *Stamina* quatuor didynama, omnia fertilia, infra faucem corollæ inserta, emergentia. *Antheræ* biloculares inter loculos affixæ, loculis ovatis divergentibus rima longitudinali hiantibus. *Stylus* filiformis apice breviter bifidus, cruribus acutis. *Drupa exsucca* nucamentacea, obovata, calyce inclusa, dipyrena, basi perforata, pyrenis bilocularibus arcte cohærentibus. *Semina* in loculis solitaria, erecta, parce albuminosa. *Radicula* brevis infera.

Frutex Australiæ borealis concinnus, glandulosus, pube ramosa articulata vestitus; *foliis verticillato-ternis* acute ovatis sessilibus serratis; *floribus axillaribus solitariis* bibracteolatis breviter pedunculatis, corollis roseis coccineo-venosis.

Genus habitu eximium, characteribus autem *Newcasteliæ* et præsertim *Pityrodiæ* valde cognatum, cum summa veneratione et gratissimo animo dicavi viro præillustrissimo Guilielmo Dennison ordinis balnei equiti, coloniarum Australiæ gubernatori, scientiarum artiumque hinc elato patrono et cultori, qui ad perlustrationem Australiæ intratropicæ phytologicam benignissime mihi obtulit facultatem.

Dennisonia ternifolia.

In rupibus originem versus fluviorum M'Arthur et Seven-Emu River ad sinum Carpentaria Gulf.

Barklya, n. g. Cæsalpinearum*.

Calyx ebracteolatus campanulatus breviter 5-dentatus; dentibus æqualibus v. summis minoribus. *Petala* 5 subæqualia obovato- v. orbiculari-spathulata longe et tenuiter unguiculata æstivatione imbricata uno ex infernis exteriore? *Stamina* 10, omnia fertilia breviter exserta cum petalis *basi calycis affixa*, libera, alterna paullo breviora. *Antheræ* sagittatæ versatiles eglandulosæ, loculis longitudinaliter dehiscentibus. *Ovarium* stipitatum, 3–4-ovulatum, glabrum. *Stylus* brevis filiformis. *Stigma* minutum truncatum. *Legumen* stipitatum compressum glabrum reticulato-venosum oligospermum, isthmis cellulosis imperfecte loculatum. *Valvæ* oblongo- v. ovato-lanceolatæ chartaceæ. *Semina* albuminosa compressa oblique ovata hinc truncata. *Strophiolum* nullum. *Cotyledones* rectæ planæ. *Radicula* brevis arcuato-incumbens hilo proxima.

Arbor Australiæ orientalis subtropicæ admodum venusta; *foliis* coriaceis *simplicibus* cordatis palmatinerviis; *racemis* elongatis conferte multifloris; *pedicellis* solitariis; *petalis* aureis.

Genus *Moræ* forsan propinquum gratissima mente et summa observantia dicatum viro excellentissimo Henrico Barkly, ordinis balnei equiti, coloniæ Victoriæ gubernatori, scientiarum fautori prænobilissimo.

Barklya syringifolia.

In sylvis ad flumen Pine River detexit amiciss. et clariss. W. Hill.

Laboucheria, n. g. Mimosearum.

Flores hermaphroditi regulares. *Calyx* infundibulari-campanulatus quinquedentatus. *Petala* 5 libera spathulato-ovata æqualia. *Stamina* decem libera glabra breviter exserta, omnia fertilia cum petalis infra faucem calycis inserta. *Antheræ* ovatæ introrsæ dorsifixæ biloculares, loculis rima longitudinali dehiscentibus, *connectivo* apice compresso *semiorbiculariter producto*. *Germen* dense pubescens. *Stylus* crassus brevissimus glaber. *Stigma* minutum concavum.

* The specimens are not sufficient to make out the æstivation of the corolla satisfactorily; but it appears to me, that one of the lower petals is the external one: the habit and other characters in the flower are those of *Cæsalpineæ*, of the subtribe *Cynometreæ*; whilst the incurved radicle would place it in the *Sophoreæ*, where I know of no gênus at all allied to it.—G. B.

Legumen oblongum continuum bivalve plano-compressum oligospermum. *Semina* rotunda compressa strophiolata.

Arbor Australiæ intertropicæ inermis; *foliis* abrupte bipinnatis bijugis, pinnis paucijugis; *racemis* lateralibus et axillaribus spiciformibus; *petalis* parvis virentibus.

Genus *Adenantheræ* proximum maxima cum pietate tributum præclaro Henrico Labouchere, rerum ad colonias spectantium summo ministro, sub cujus auspiciis alteram expeditionis Gregorianæ partem fauste perduximus.

Laboucheria chlorostachya.

A plagis boreali-occidentalibus Australiæ usque ad flumen Burdekin tractus orientalis, tam in solo fertiliore quam steriliore planitierum montiumque satis frequenter obvia.

Illa arbor infelicissimo nostro Leichhardtio "Leguminous Iron-bark tree" nuncupata huc pertinet.

Dabam ex horto botanico Sydneyano, idibus Martii 1857.

Note on the Morphology of the *Balsaminaceæ*.
By Prof. HENFREY, F.R.S., F.L.S.

[Read Dec. 2, 1858.]

THE different theories which have been proposed to explain the irregular character of the flower of *Impatiens* are briefly enumerated in Lindley's 'Vegetable Kingdom' (p. 490), where the view of Kunth is adopted, namely, that the organ standing on the opposite side of the flower to the spurred sepal consists of two confluent sepals, which, with the spurred sepal and the two small lateral sepals, make up a 5-leaved calyx; while in the next circle a petal is suppressed which should stand before the line of junction of the two confluent sepals. An apparently accidental confusion exists, however, in the description of the flower of *Balsaminaceæ* given by Dr Lindley: the spurred sepal is correctly stated to stand next the axis of inflorescence (posterior); nevertheless the supposed "double sepal" on the opposite side of the flower is called "dorsal" and "back-piece," notwithstanding that it stands in front within the subtending bract. This *lapsus* is rendered more serious by the woodcut of the diagram of the flower of *Impatiens* being reversed, so as to show the spurred sepal in front.

Kunth's view, supported by Walker-Arnott, and adopted by Lindley, was, we think, sufficiently refuted by Rœper (Linnæa,

ix. p. 112), from the consideration of the structure of the genus *Hydrocera*. Through the kindness of Dr. Hooker, I have seen further observations by himself and Dr. Thomson, which not only confirm Rœper's view, in reference to *Hydrocera*, but illustrate it further by certain East Indian species of *Impatiens*, in which the number of sepals is either regularly or occasionally the same as in *Hydrocera*. In this genus the calyx has five sepals: first, the posterior spurred sepal; next, two lateral sepals, corresponding to the two small and usually green sepals of *Impatiens Balsamina*; with two anterior sepals, which are mostly suppressed in *Impatiens*. Within this circle occurs a whorl of five petals, the anterior one being the so-called "double sepal" of Kunth, which is *inside* the two anterior sepals just referred to.

Payer (Traité d'Organogénie végétale) states that he finds the rudiments of this pair of anterior sepals on very young buds of *Impatiens Royleana*. I have not been able to find them in the Garden Balsam, nor in a developed state in the numerous monstrous specimens which I have examined. On the other hand, the monstrosity presently to be described favours the doctrine of Rœper far more than that of Kunth. In order to explain it more clearly, I have appended diagrams of the normal structure of *Impatiens* and *Hydrocera* (figs. 1 and 2).

It is a well-known fact that the common Double Balsams of our gardens produce seed freely. Since only one circle of stamens exists, we should scarcely have expected this; but the fact is that an extra corolline whorl is produced without the suppression of the stamens, and the metamorphosis takes place in a manner which bears an interesting relation to certain general questions of morphology, as well as to the theory of the flower of *Impatiens*. In the common Double Balsams of our gardens the flowers usually present a natural calyx, the small lateral sepals being often more or less coloured, and sometimes gibbous or slightly spurred; I have never found the two anterior (suppressed) sepals developed. Within the calyx stand five petals (a broad anterior one and two pairs of lateral petals), which are, as usual, mostly more or less adherent by their limbs on each side, but with their claws free. Succeeding these are found five free petals resembling in appearance the lateral petals of the previous whorl, standing in the usual place of the stamens—that is, alternating with the normal petals, as shown in the diagram (fig. 3). Next comes a circle of five stamens, mostly all perfect, alternating with the preceding circle, and therefore in the ordinary place of the carpels. Lastly, the

five-celled ovary has its carpels alternating with the stamens so that the odd one is necessarily posterior instead of anterior, as in the normal condition.

Here therefore we have a case of "doubling" distinctly referable to an absolute increase in the number of whorls of organs; for the regular alternation of the organs of successive whorls, both in the normal and monstrous forms of the same flower, precludes the idea of any development of usually suppressed organs, and of any *dédoublement* or *chorisis*, to which recourse is had, perhaps too frequently, for the explanation of double flowers.

Such multiplication of whorls doubtless occurs to a considerable extent in cultivated plants, especially in genera with few stamens and carpels. In the double Daffodil there are found forty or fifty petaloid organs, while the flower naturally contains only fifteen organs; and each piece exhibits a more or less perfect lobe at the junction of the claw and limb, showing that there is no *chorisis* causing the separate development of the coronal lobes.

In most cases of doubling we find more or less of the organs abnormally developed, rendering the conditions somewhat obscure; but in these Balsams the circles are formed of perfectly natural structures; and there is a point of physiological interest in the throwing forward of the functions consequent upon the conversion of the organs. The stamens are replaced by petals, the carpels by stamens; and an additional whorl of carpels is produced at the summit of the axis. Generally speaking, the stamens are well-developed; but now and then one or two are found sterile, or surmounted by small petaloid lobes.

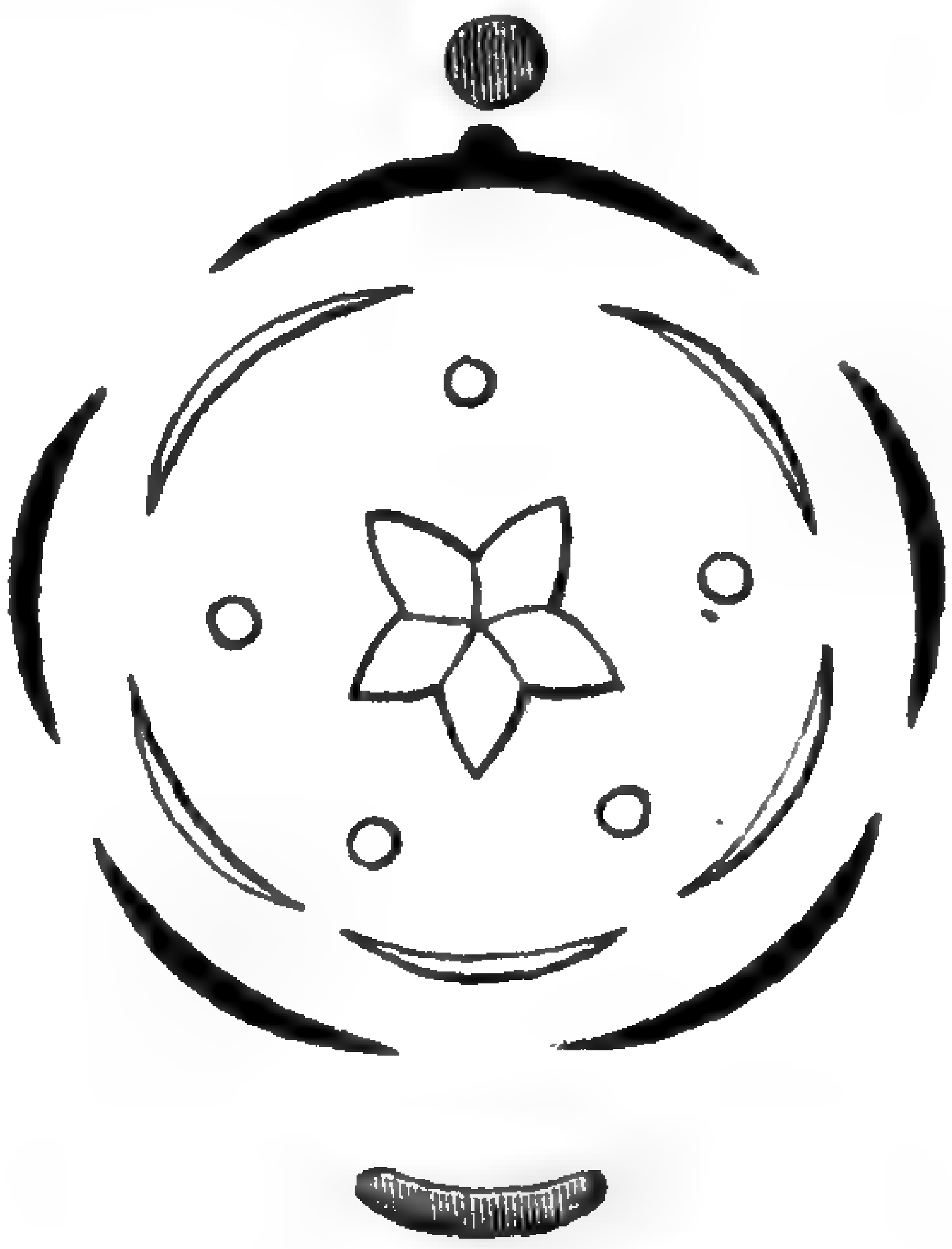
These monsters are more favourable to Rœper's than to Kunth's view; for, if what we regard as the anterior petal were a "double sepal," we should expect to find a petal developed within it, opposite its commissure, which was never the case in any of the very numerous specimens examined.

Somewhat related to the above metamorphoses are the conditions described by Al. Braun in *Delphinium* (Pringsheim's Jahrb. f. Wiss. Bot. 1857, i. 206). In that genus the stamens and carpels are members of a continuous spiral series, not of successive whorls. In *D. cardiopetalum* the spiral is (approximately) $\frac{3}{8}$; so that the 9th organ is opposite the 1st, &c. In cases where 16 stamens were found, the first carpel, being the 17th organ of the series, stood opposite stamens No. 9 and No. 1; the second carpel (18th organ) was opposite stamen 10, &c. (fig. 4). In another case 18 stamens were developed before the carpels appeared, in which case

Fig. 1.

Impatiens Balsamina.

Fig. 2.

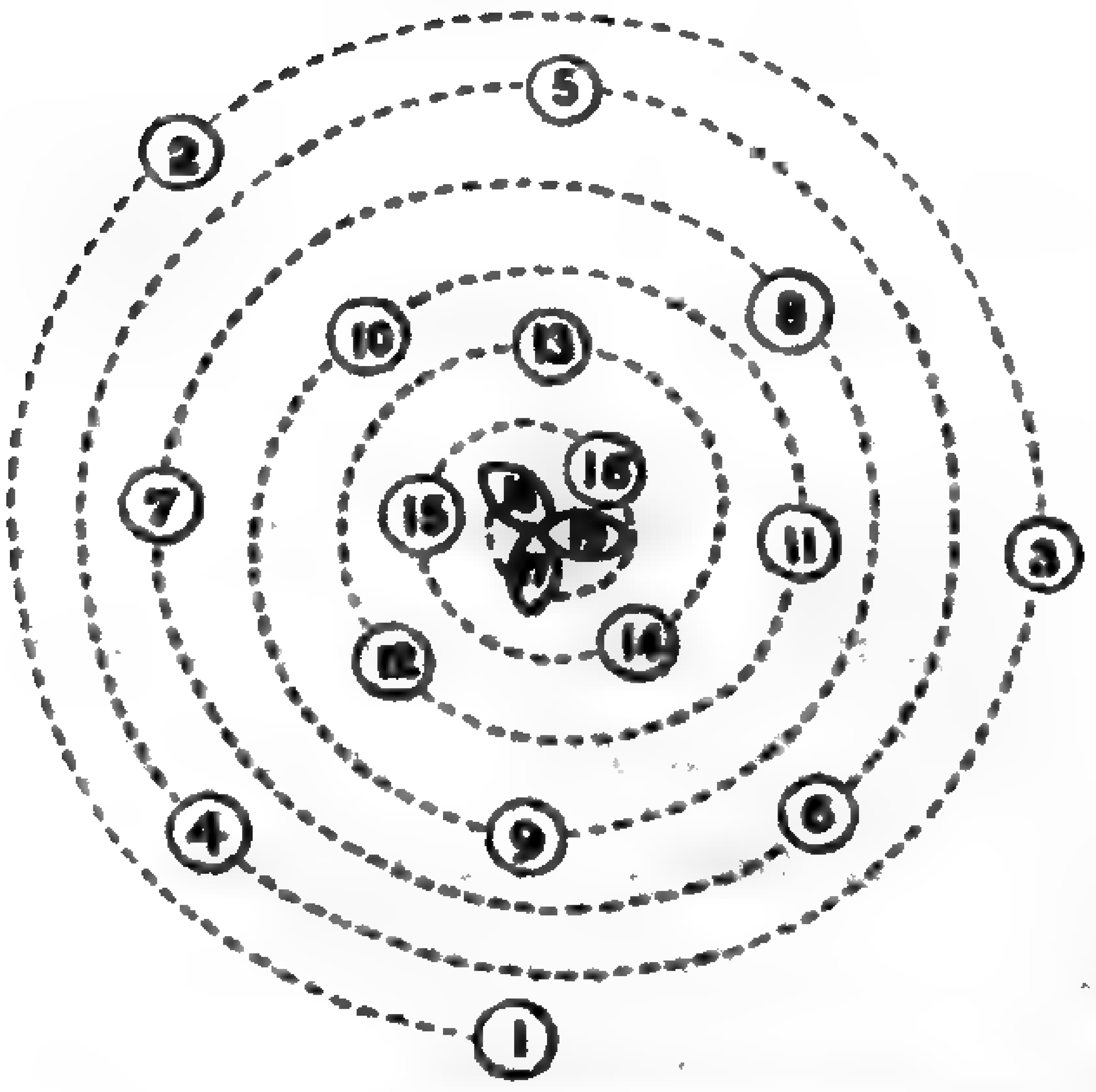


Hydrocera triflora.

Fig. 3.

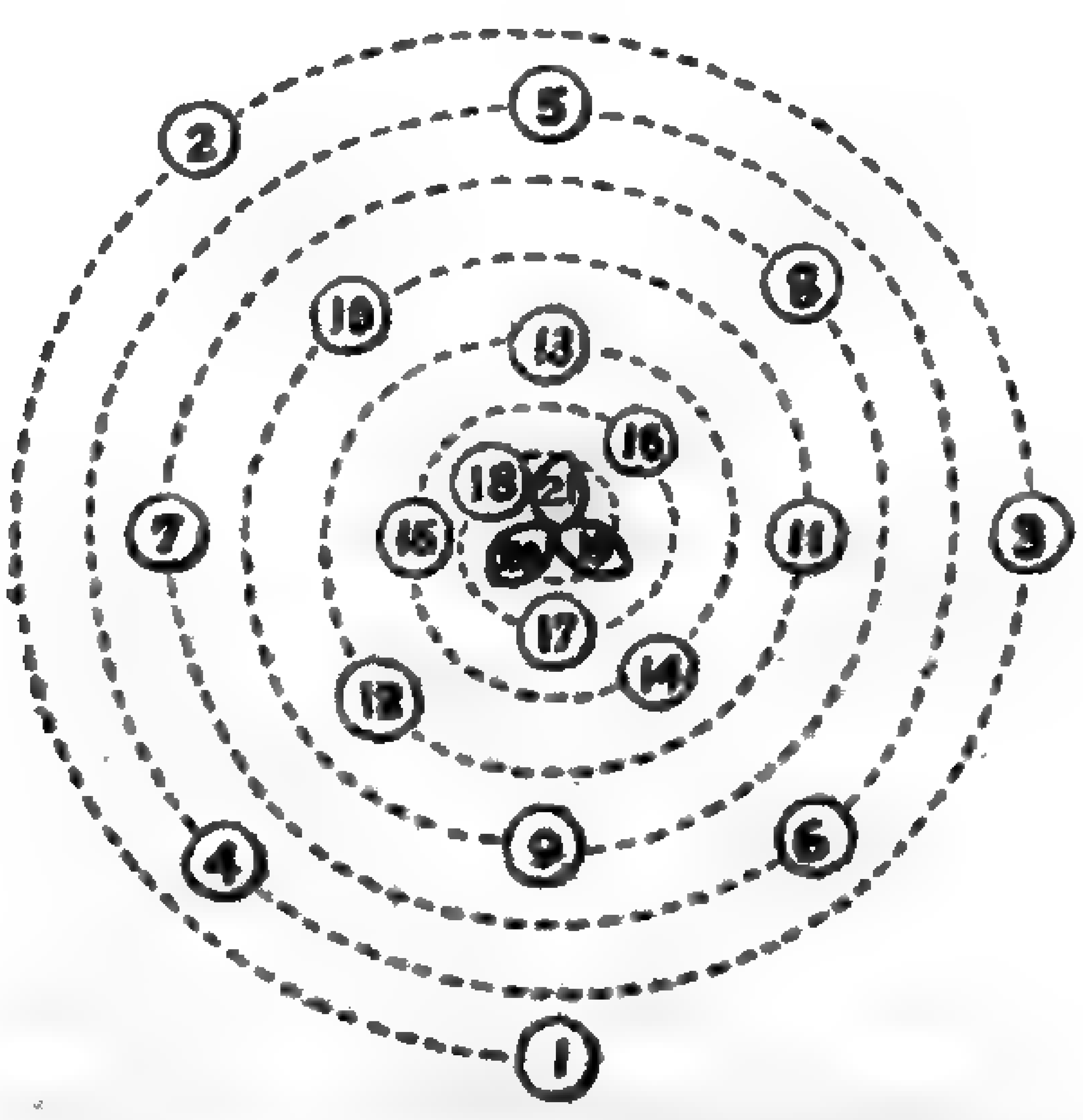
Double Garden Balsam.

Fig. 4.



Delphinium cardiopetalum
(16 stamens and 3 carpels).

Fig. 5.



Delphinium cardiopetalum
(18 stamens and 3 carpels).

the first carpel (organ 19) stood opposite stamen No. 11; the second carpel (organ 20) opposite stamen No. 12; and the third opposite No. 13 (fig. 5). This advance of the stamens, driving forward the carpels, is still more clearly seen when only one carpel exists, since this then stands, according to circumstances, in an anterior, lateral, or posterior place. These conditions seem exactly comparable with the advance of the stamens in an entire whorl, and the production of a new whorl of carpels, such as I have described in the double Balsam.

On the Arborescent Ferns of New Zealand. By THOMAS SHEARMAN RALPH, Esq., A.L.S.

[Read Dec. 2, 1858.]

THINKING that some observations on the Arborescent Ferns of New Zealand may interest the members of the Society, I have thrown them into the form of a paper; and I have also forwarded specimens to illustrate the various points which I think are either unnoticed or are most worthy of remark.

Of the four species of *Cyathea* described in Dr. J. D. Hooker's 'Flora of New Zealand,' the most prominent one is the *C. dealbata*, or Silver Fern, known by its straight upright stem and white fronds. It is by far the commonest species, and grows in all situations, from the stream in the bottom of the gully to the very tops of the highest hills (in the south part of the north island), where perhaps it is more inclined to form groups.

C. medullaris, or Black Fern, can be recognized in the early stage, before it has made much stem, by the very long fronds mounted on long black stipes, rising almost perpendicularly upwards, while its greater height and more solid appearance of stem mark it out at an older stage.

C. Cunninghami is scarce, and likely to be often passed over as *C. Smithii* in the dark recesses of the gullies in which it chiefly delights to shelter itself; but it may, after some acquaintance, be picked out of the crowd at a little distance. When very young, its stem is entirely covered with the remains of the black bases of the stipites, from which the dead fronds dangle all the way up, giving it a very untidy and ragged appearance. The darker hue of its fronds, which in the older state of the plant are as many as thirty or forty in a head, and form a funnel-shaped crown, serves also to distinguish this species from—

C. Smithii, whose delicate spreading fronds of brighter green are mounted on a stem which is furnished with a wiry fibrous structure, and whose top is adorned (?) with the remains of the stipites of dead fronds, hanging closely to the stem, from sixty to seventy in number, but all *divested* of the pinnæ. This is what may be seen in the bush when uninjured by the action of violent winds. Thus much for a glance at these species; a more detailed account I now give, from investigations carried on uninterruptedly during three months.

C. dealbata (White or Silver Fern) presents two or perhaps three forms; but the characters are scarcely marked enough to make out so many varieties. One state of the fern is marked by the frond being furnished with sori well within the margin, thus giving the appearance of a broader pinna, &c.; another form appears to be characterized by a more delicate frond; while a third is a coarse or hard-fronded form, with a yellowish hue along the upper side of the main and partial rachis, and which is perceptible at a distance—the pinnules are also inclined to curl inwards at the margins: this may be termed the full-fruited form, as the sori are very abundant.

No decided character can be drawn from the persistence of the bases of the dead fronds. I have seen these stipital remains covering a stem (of *C. dealbata*) from top to bottom, in others halfway up, in some on one side only; seldom, however, is the stem entirely bare, but a wiry fibrous structure (aerial rootlets) issues out and covers it more completely. When this tree-fern has attained some size, the base gradually enlarges by the addition of these fibres, till it reaches perhaps a foot and a half in diameter. The greatest height to which it seems to attain is about 24 feet. The fronds vary from 8 feet to 12 feet in length and from 2 feet to 3 feet in breadth, and they spring out nearly horizontally from the crown.

Although the fronds are so beautifully white underneath, it is almost impossible at times, even in open places, to be sure one sees a white-fronded fern; but a blow from a stick or a wave of the wind is necessary, to turn but a little portion of the frond, in order to satisfy the observer that it is white beneath.

C. medullaris (Mamaku, or Mamagu of the natives, Black Fern of the settlers).—This fern may be recognized at a very early stage of its growth, and before any trunk has been developed, by the general form and texture of the young frond. The main rachis is usually of a very dark-brown or black colour. When it has formed a stem, it will be observed that these black stipites are

closely pressed to its sides and spring upwards nearly straight and almost parallel with the direction of the stem, till the first or lower pinnæ are produced, even to a distance of five, six, or more feet; from this point the frond springs outwards, and, carrying its breadth well up into the air, brings its apex out a little below the body of the frond. The rachis is rough to the touch, and rounded in form, with a perceptible channel or mid-groove commencing some distance above the base. [A portion of the rachis cut off here, for three feet or more, has very much the appearance of a double-barreled gun, from the groove and the dark colour.] Lower pinnæ alternate, ascending nearly at right angles with the rachis, while the succeeding ones gradually assume the horizontal direction (from the rachis). Fronds coriaceous, usually of a bright shining green above, paler beneath, 6–9 springing out at once, and at this stage of its growth appearing to be rather brittle.

When this fern has made a stem of ten feet or more, it will be noticed that the stem is ragged, from the remains of the fallen fronds, the stipites of which, often empty of cellular matter, hang merely by the internal fibres and outer black shell-like covering. When these last have decayed away, the fibres in connexion with the scars on the stem still stand out like so many dried-up grassy tufts. Should the stem at this time begin to form its dense, matted, granular addition, which it puts on sooner or later, and by which the stem is greatly increased in diameter up to a variable height, then these persistent fibres occasion the additional growth to protrude over them, thus making this portion of the stem appear more knobbed than it otherwise would do. As this fern usually grows on the side of a gully, and generally on one side of it in preference to the other, this additional growth is always greater in thickness towards the centre of the gully and away from the bank, and gives the lower part of the stem a kind of rough-triangular form. This growth sometimes attains a girth of six or seven feet, extending in a gradually lessening deposit upwards to a height of perhaps ten or more feet from the ground.

This is a provision of nature applied to the weaker side of the stem, occasioned by the damp and moisture trickling down the stem, and provides a firm buttress to the lofty rise of the stem, which sometimes attains a height of forty or fifty feet, and even, as it is said, of eighty. The trunk seldom rises straight up, but takes a bend or stoop, and always towards the gully, as if it experienced a great weight of fronds; and having formed this additional prop, it

seems to recover strength and determination to ascend more straightly than before.

It is to be observed that as the stem attains a height of ten feet, or thereabouts, the stipites become shorter, or, in other words, the pinnæ are set closer to the base of the stipites—but these last still continue close-pressed to the stem,—that the black colour above is replaced by a yellowish green, and greater asperities make their appearance beneath, and are extended now all the way up the rachis. The rachis in its outline is altered from the rounded to a flattened form; and as it springs from the stem, it assumes a gentle curve, so as to bring the frond to a horizontal position. The fronds are now seldom more than twelve feet in length, and of such a weight as to require considerable effort to raise them off the ground by one end in order to shoulder them, when one may be readily carried. At this more mature stage of growth, the fronds, when fully ripened, decay somewhere about six inches from their insertion into the stem, and no doubt suddenly fall from their horizontal position to a pendent one, and remain suspended perhaps during the greater part of the winter, giving a majestic tree fern the appearance of wearing a clothing of matting, much like a native chief. These fronds ultimately fall off, and leave the stem almost bare, so as to show the scars. This fern is seldom beset by climbing plants,—a circumstance possibly due to the long persistence of the stipital remains.

If the stem of *C. medullaris*, of a height varying from 20 to 40 feet, be examined, the following will be the features it will present. A large, rough, black, triangular-shaped buttress tapering upwards to 6 or 8 feet, when the original stem will most likely be seen marked with elliptical-shaped scars of 6 or 8 inches in length and about 3 in width. As the eye is carried higher up, these scars will be seen to be set closer together, and to become altered in form; and at a height of 20 feet and upwards, they become nearly hexagonal, and very regularly placed; so that six of them occupy the circumference, while the six above and those below alternate with them. The woody matter at this part is very hard and heavy with sap.

I have counted about 34 or 36 fronds in full vigour in one crown at one time; and, supposing that a circle of fronds attain their full growth and live only six months, it will be seen that these ferns are slow growers.

The linear form of the scars below accords with the brittle nature of the rachis and their mode of intortion, by which a great

amount of weight is taken off from the young and soft stem,—while the advanced stage of growth is marked by the addition of a buttress, more closely-placed scars, harder woody structure, and heavy *horizontally*-placed fronds. I feel almost certain that the different appearance of the young- and the older-formed fronds has given rise to the idea of two species, not only in these islands, but also, in some descriptions, in other places.

I now come to the other two Cyatheas; namely, *C. Cunninghamii* and *C. Smithii*. I have found considerable difficulty in making out these two species even when accompanied with plates and descriptions.

C. Cunninghamii, or Warted Cyathea, as I have called it for distinction.—This fern is seldom met with, except in the vicinity of streams in the bush; and where this is cleared away, I think it ceases to increase. It appears to me to be less able to resist exposure than either of those already described. It attains a height of 20 feet, or perhaps more, and forms a basal fibrous structure, much resembling that of *C. dealbata*, which extends about 5 feet up. The stem is characterized by the remains of the black persistent bases of the stipites, which are mostly close-pressed to the stem for a foot or more; and these, being hollow from decay of the cellular substance, often contain plenty of water, and give the stem, which is comparatively slender, a ragged, untidy appearance. The young fronds, or rather as they emerge from the fern, are fully charged with scales, which, on the main rachis, appear to me to point towards the base, and not upwards to the apex, of the frond. The fronds are heavier than in *C. Smithii*, and appear from 20 to 30 in a crown. Rachis marked with linear warty scars on either side, besides presenting a remarkable warty or glandular (?) opening situated at the base of each pinna springing from its sides. Sori numerous, generally on all the pinnæ; the fertile fronds appear sometimes to be alternate, and are more contracted than the barren ones.

I have called this the *Warty* Cyathea, to give it a local English name, as the others are termed black and white, &c.

C. Smithii, or acorn-fruited Cyathea.—This fern also is most frequent in the immediate neighbourhood of streams, at the bottom of well-sheltered gullies. Soil wet or swampy. Stem fully 22 feet high, densely fibrous below, a little resembling that of *Dicksonia antarctica* (at the base), and remarkable for the dead *pinnaless* fronds, or rather raches, hanging from the upper part. Fronds lanceolate, bipinnate, bright shining green, 8–9 feet long, and very

light: pinnæ 20–22 pairs, springing from the upper rounded surface; lower short and erect; middle ones gradually assuming the horizontal position. Veins simply pinnate in barren fronds, forked in fertile ones. Indusium truly cup-shaped, open above, and protruding the compactly arranged sporangia to double the distance; they are covered by it below; receptacle large and club-shaped. I believe the cup *never* covers the sporangia. The main rachis is brownish, channeled above, rough beneath with minute points, the sides being covered at their early stage with soft scales or paleæ, as also are the partial ones. Warty scars situated *between* the pinnæ and on the sides of the rachis.

Note. This fern wants the characteristic sudden acuminate point of the pinnæ, so remarkable in the other three species.

I first noticed this species springing from a trunk which had been buried in the side of a gully by the falling in of the soft upper soil; and it had formed a stem 6 feet high, rising up at a right angle from the stem. I subsequently noticed many other specimens both of this species and of *C. Cunninghamii* similarly circumstanced.

I have sent with the stem-sections some natural skeletons of the stem of *Cyathea medullaris*, which may be of service to compare with some geological remains. I think it is evident also that the natives of New Zealand have taken their scroll-like ornaments, in their houses, &c., from the gyrate fronds of the large ferns, and also from the curious markings on the long scars of the stems when they have decayed off the cellular substance. These stems were in use as fencing, round their paas or villages. (See 'Illustrations of New Zealand Scenery,' &c.)

Dicksonia antarctica.—This tree-fern is getting scarce about Wellington, while *D. squarrosa* seems to be met with rather more freely. A specimen of a stem, which I have sent, was part of one 5 feet high. There was another which stood by, 12 or 15 feet in height; but I had not the heart to cut it down. The lowest part of this last was hard and fibrous, and very different from the specimen sent; but the upper half was so soft, that I could impress it easily with my fingers. The lower portions had become hardened, partly from the decay of the very soft woolly substance which exists so abundantly at the bases of the stipites, and also from the increase in size of the root-like fibres which penetrate the woolly portion. This woolly substance, of a beautiful auburn colour, serves to retain a great amount of moisture around the rootlets which emerge from between the stipites, and facilitates

their growth. A transverse section of the stem varies considerably, according as it is cut high up or low down, as may be seen in my specimens. A section taken 3 or 4 feet from below the head gives us a woody centre or cylinder, and around it an immense mass of a very dry light-brown substance, penetrated by root-like fibres, without any trace of a stipe-like nature. A section, taken 2 feet above this, gives the cylinder closely surrounded by transverse sections of the remains of the stipites,—some 50 or 60, or more, remaining distinct, close-pressed and packed together, with traces of fine hair-like fibres, which clothe the bases of the stipites. Outside these is a surrounding mass of a looser and coarser texture, consisting of a mass of matted fibres of a root-like appearance, and decaying stipites, which have almost lost their form in the general decay. On making a vertical section (and this I believe is best done in recent fern-stems by splitting them with a wedge in place of sawing), it will be seen that the woolly substance closely invests the bases of the stipites, which are deeply buried in the substance of the woody cylinder; and a number of rootlets may also be traced issuing outwards: these, I think, sometimes ascend and then turn downwards, increasing, and penetrating the decaying stipites, and in process of time forming a tangled mesh or net-work of a coarse kind, and which remains after the decay of the fine hairy fibres and the stipital bases. Perhaps this state of things has led to the enumeration of a third species of *Dicksonia* in these parts. As yet I have only met with two.

D. squarrosa.—The fronds are about 8 to 10 feet long; stem 16 feet, &c., slender; small rootlets spreading in irregular masses here and there, and forming irregular growths, which ultimately unite, but no appearance of a coating of a fine fibrous nature. The black stipites run up the stem for a foot or more, and ascend clear of the head 18 inches or 2 feet before the lower pinnæ appear, being clothed with inch-long, erect, brownish-black hairs or setæ, springing from the upper surface and sides of the stipe; rough, with minute tubercles; branching rootlets, tufted with brownish tomentum issuing upwards from between the stipites. The very young gyrate fronds are clothed with auburn hair.

The Indian Species of *Utricularia*. By DANIEL OLIVER, Esq., Jun., F.L.S.

[Read Dec. 16, 1858.]

SOME few months ago Dr. J. D. Hooker was kind enough to entrust to me, for arrangement, the very valuable collection of Utricularias brought together by himself and Dr. Thomson during their recent Indian journeys, with also an ample series of the Southern and Ceylon species collected by the late Dr. Stocks, and the numerous excellent botanists whose contributions are acknowledged by the authors of the 'Flora Indica' and the 'Præcursores.' In addition to these, moreover, I may mention the important series in Griffith's extensive herbarium, until recently in the keeping of the East India Company, but now, through the exertions of Dr. Hooker, in course of arrangement at Kew. From the excessive entanglement of the nomenclature of this interesting genus, at least of its Indian members, I found it needful thoroughly to re-examine nearly every form, and to work them up in the first place almost *de novo*, irrespective of their literature; and it is in the trust that the views which I have felt myself required to adopt, as to the limitation, &c. of the species, may serve as a stepping-stone to their more complete illustration, that I venture to lay before the Linnean Society the result of my inquiries. A few species from the temperate region of the Himalaya are new, and especially demand publication, from their common peculiarities.

In the elaboration of these plants, I have derived great advantage from the herbaria of Sir William J. Hooker, of G. Bentham, and Dr. Wight, which have been most freely placed at my service; these, with our Wallichian and Smithian collections, and the important fasciculi preserved in the British Museum, have been invaluable in determining their synonymy, otherwise quite inextricable, as well as their range in respect not only to variation in form, but also of geographical distribution within the borders of the Indian empire. Unfortunately, the insufficiency of material, particularly as to North Australian and African species, and, to some extent, to those of the Eastern Archipelago, precludes any satisfactory working-out of their general distribution; and upon this head, from the importance of absolute accuracy in the identification of species, I feel it the safest course to say but little. I have especially to congratulate myself on the ample

suites of specimens which have been placed in my hands illustrative of each or of most of the species. I have thus been enabled to dissect and compare numerous examples, and have been spared the contracted views of their specific limitation, which, with less ample material, I should surely have adopted. The chief difficulties in their study I have found to arise from the extreme brevity and insufficiency of the older descriptions, and the multiplication of 'book species,' founded upon the unwarrantable data afforded by solitary or very imperfect specimens. The examination of the parts of the flower in the Utricularias, also, is a labour absorbing much time, from the care required in their dissection, resulting less from any structural complication than from the marked tenuity of the corolla,—while the frequent variability, even in the same species, in the form of parts upon which important characters are often based, demands an attentive comparison of examples. The settlement of the synonymy of several species, and the reduction of those specific names which have been applied either to individual varieties or to mere forms, has been, I hope, not an unuseful result of their study.

The more important recent contributions to our knowledge of these plants are the papers of Benjamin, in the 'Botanische Zeitung' and the 'Linnæa;' of Edgeworth in the 'Proceedings of the Linnean Society;' of Dalzell in the 'Kew Journal of Botany;' and the figures and descriptions in the 'Icones Plantarum Indiæ Orientalis' of Dr. Wight. With regard to the descriptions of the first-named author (although generally drawn up with care, yet founded too often upon very imperfect and incomplete examples), I should have felt them particularly embarrassing, were it not that, in the herbarium of Sir W. J. Hooker, I have had access to specimens of many of them authenticated by his own labels. The contribution of M. P. Edgeworth, contained in the first volume of our old 'Proceedings,' I should have most certainly overlooked, had not J. J. Bennett kindly called my attention to it. Its most important feature is the description of a supposed new genus of *Lentibulariæ*, under the name of *Diurospermum*, from the Western Himalaya. It would appear that no specimens of this plant have been sent over by the author of this paper; at least, in the herbaria to which I have referred, none are to be found; but I feel tolerably confident that his plant may be recognized in a small and very interesting species collected in Kumaon by Strachey and Winterbottom. I account for one or two little discrepancies by the assumption that Edgeworth's specimens have been either few or

in an advanced state of growth, the chief difference between the description of his plant and that of S. and W. being the lobate upper segment of the calyx of the former. I find, in one or two *Utriculariæ* of this group, that this lobe of the calyx, originally entire, or at most retuse or emarginate, often splits more or less towards maturity, thus presenting quite a bilobate form. The appendaged seeds are very remarkable; but in this respect they differ from other Himalayan species of the same series (including the well-known *U. orbiculata* of Wallich) merely in the form of the produced epidermal cells of the testa, which, as noted by Dr. Wight, in this latter species are glochidiate or capitate, while in the Kumaon plant they are elongated hairs from the extremities.

The Sikkim and Khasia collections of Dr. Hooker include two or three new species belonging to the same group with these plants; but I have not been fortunate enough in every case to meet with matured seeds, the further examination of which is very desirable. These singular Utricularias constitute a most interesting section of the genus, characterized by small stature, orbiculate, reniform, or obovate-spathulate leaves, very unequal calyx-lobes, the lobed, more or less plane, lip of the corolla, and (so far as sufficiently matured specimens enable me to speak) the appendaged seeds; perhaps, too, the dehiscence of the capsule, and the ultimately more or less reflexed inferior lobe of the calyx, may be common to them. Although these characters confer a striking individuality, yet I do not discover that the species presenting them are entitled to a rank superior to that of a subgenus. They are, too, so essentially *Utriculariæ*, that by separating them we should open a door yet more widely to a destruction of the genus as interpreted in books—already, indeed, impending from the separation, by some writers, of certain South American forms. It is perhaps possible that a carefully conducted series of observations upon the embryo and structure of the seed may lead to a different conclusion; but until such observations are forthcoming, the more correct course is undoubtedly to retain them as a section of the genus. Dr. Wight, in his valuable 'Icones' (vol. iv.), figures and describes twenty-three species. Some of these, in most cases identified in his herbarium, after examination and comparison with other series, I have thought it quite impossible to maintain, and have accordingly reduced them. Dr. Wight particularly observed the characters afforded by the surface and form of the seed in certain species, resting, in some cases,

important specific characters upon them. I have examined the seeds of many species, and believe that marked characters, available in their discrimination, are, in some instances, afforded by them. The variety in their form and surface is striking; but we are yet very deficient in information as to whether parallel differences are presented in the internal structure of the seed, which it is extremely difficult to investigate in many instances—in part from the excessively oleaginous nature of the cell-contents, and perhaps, too, the relatively small or imperceptible cotyledons. Of the older descriptions of Indian *Utriculariæ*, the most important are those of Linnæus and Vahl. From the accumulation of species subsequent to their period, the extreme brevity of their notices, and the imperfection of the absolute material upon which they were framed, it is very difficult, and frequently indeed impossible, to arrive at a confident determination of their species. When authentic specimens have been accessible to me (as in the case of the Linnean Herbarium) corresponding sufficiently nearly with the published descriptions of the author, I have adopted the Herbarium names; in the case, however, of a few of Dr. Kœnig's plants in the collection of the British Museum, which appear to be unusual or aberrant forms of frequent species, or else very imperfect and insufficient for positive determination, I have not thought it desirable to disturb nomenclature unduly by the adoption of the Vahlian names which, with reason, may be supposed to apply to them. Examples of a *Utricularia*, however, in that herbarium, from Dr. Kœnig, bearing the name *U. flexuosa* Vahl, together with the description of that species in the 'Enumeratio Plantarum,' compel me to give it its fair precedence, at the sacrifice of Dr. Roxburgh's generally adopted name, *U. fasciculata*.

In the distribution of the Indian species in this paper, for the purpose of ready reference, I have availed myself of sectional characters, based upon, chiefly, the presence or absence of a leafy axis, whether submerged or terrestrial; the attachment of the squamæ* and bracts; the length of the pedicels; the direction and

* I employ the word '*squamæ*,' with previous writers, to denote the minute empty scales attached, like the bracts, sometimes by the base, sometimes about or below the middle, to the scape. Although the transition to these from the true leaves at the base of the scape, or, when present, from the capillary segments of the submerged axis, may be very abrupt, I take them to be reduced foliar organs, referable probably to the 'hypsophyllary' series, and corresponding to similar appendages in *Pyrola*, &c.

At the base of the pedicel, in nearly all of the Indian species destitute of a floating axis, are found, by and within the bract (as noted in the sectional cha-

proportion of the spur of the corolla; the comparative proportions of the calyx-lobes, &c. The sections of A. De Candolle employed in the 'Prodromus,' of questionable utility in their general application, are almost useless in the apportionment of the Indian species.

Finally, I may be allowed to express my conviction, that in the investigation of the development and general morphology of the 'Bladder-worts,' there is a wide field for extended observation; and I believe that a monograph of the genus, thoroughly worked out in respect to these, would be, although a work of much labour and difficulty, a most valuable contribution to science.

UTRICULARIA, *L.*

§ I. *Scapi ex axi demerso, segmentis multisectis plus minus capillaceis sæpissime aciculiferis, per florescentiam persistente. Bracteæ solitariæ* (i. e. *bracteolæ nullæ*).

A. *Scapus vesicis inflatis in verticillum unicum dispositis instructus* (vide obs. sub *U. flexuosa*, infra.).

1. U. stellaris, *L.*; *Wall. Cat.* 6400; *A. DC. Prodr.* viii. 3; *Wight, Icones*, 1567.

Loc. Per totam Indiam tropicam. Moradabad, *hb. Hook.*! Rohilkhand, *Edgew.*! Concan, *Stocks*! Tanjore et Orissa, *Wight*! Carnatica, *Kœnig.* &c.! Khasia, *hb. Griff.*! Forma macrocarpa, Nipalia, *Wall.*! &c.

Distrib. Nubia, *Kotschy*! Africa aust., *Dreg.*! (Nov. Hollandia bor., *Mueller*?)

Scapi supra v. infra medium vesicis circiter 3–5 lanceolatis oblongis v. ovato-oblongis apicem versus filamentis capillaribus plus minus ramosis instructis in verticillum sæpissime dispositis. *Pedicelli* apice sæpe incrassati fructiferi patentes v. deflexi capsulam æquantes v. excedentes.

Corollæ labio superiore ovato v. rotundato obtuso calyce sæpe duplo longiore, calcari brevi saccato obtuso v. alabastro emarginato corollæ

racters), a pair of very small laterally disposed laminæ, which I call *bracteolæ*; these, in certain species, almost equal the bract in length and proportions, excepting that in the case of those having bracts volute at the base, the bracteoles are, I think, not to the same extent free below their attachment. In none of the Indian *Utriculariæ*, however, do the bracts and bracteoles assume anything like the development of those of the singular section '*Orchidioides*' (A. DC.), a South American group of the genus, in which they are relatively very long, attaining a length of from ¼ to ¾ in.

labium inferius versus curvato et idem subæquante. *Capsulæ* globosæ lobis calycinis ovatis rotundatisve sæpe inæqualibus plus minus obtectæ, seminibus peltatis 5–6-angulatis.

β, *Coromandeliana* (A. DC. Prodr. viii. 4.), forma tantum mihi incognita.

B. *Scapus nudus vel squamis paucis instructus.*

2. U. flexuosa, *Vahl, En. Pl.* i. 199. (U. fasciculata, *Roxb. Fl. Ind.*; *Wall. Cat.* 1499; *Wight, Icones,* t. 1568.—U. inæqualis, *Benjamin in Linnæa,* xx. 304 (exempla cujus cum schedulis auctoris in *hb. Hook.* vidi, forma mera gracilior *U. flexuosæ*).—U. ramosa, *Vahl? Ind. or.*; *Kœnig, hb. Mus. Brit.* ?)

Loc. Per totam regionem tropicam. Ludihana, *Edgew. in hb. Bth.*! Assam (Goalpara, &c.) *hb. Wall.*! *hb. Hook.*! Silhet, *hb. Wall.*! Nipalia, *hb. Wall.*! Malabar, *Wight*; Bengalia, *Rxb. in hb. Mus. Brit.*! Travancore, *hb. Wall.*! Ceylonia (C. P. 2089), *Thwaites*! Tavoy, *hb. Wall.*! Mergui, *hb. Griff.*!

Forma gracilis:—Ceylonia (sub nom. *U. vulgaris,* Macrae), *hb. Hook*! Burdwan! Chittagong, *J. D. H. et T. T.*! Malacca, *Cuming,* 2278!

Vesicæ natantes (vel axes foliacei potius abnormaliter dilatati sæpe 2-unc. longi lineares) foliolis capillaribus multisectis passim instructæ (ut in *U. inflata,* sp. occid.) prope basin scapi in verticillum infrequenter dispositæ sunt.

Pedicelli primum erecti fructiferi sæpius deflexi. *Calyx* lobis fructiferis accrescentibus divergentibus sæpe plus minus inæqualibus. *Calcar* breve curvatum v. porrectum obtusiusculum, corollæ labio inferiore late ovato palato (fid. sched. in hb. Wight) valde prominente macula aurantiaca notato brevius longiusve. *Semina* peltata plerumque 5–6-angulata.

U. confervifolia, *Don, Prodr. Fl. Nep.* p. 84, specimen auct. imperfectum cujus in hb. Mus. Brit. vidi, *U. flexuosæ* valde accedit et verisimiliter eidem referri debet.

3. U. PUNCTATA (*Wall. Cat.* 2121). Scapo 4 unc. ad ped. et ultra pauci- multifloro sæpe elongato cicatricibus minutis pedicellorum bractearumque delapsorum nonnunquam notato, pedicellis gracilibus fructiferis adscendento-patentibus apicem versus erectis bracteis basi-volutis suffultis, calycis lobis subæqualibus ovato-rotundatis superiore corollæ labio superiore brevi rotundato integro breviore lobo inferiore calcari crasso subcylindraceo obtuso corollam vix excedente dimidio breviore, capsula ovato-oblonga v. ovata obtusa calycem denique superante, seminibus peltatis suborbiculatis circumalatis margine profunde dentato-laciniatis.—*Wight, Icones,* 1570.

Loc. Tavoy (W. G.), *Wall.*! Rangoon, *hb. Wall.*! Mergui, *Griff. in hb. Hook.*!

Folia demersa segmentis capillaribus dichotome multisectis aciculifera.

Bracteæ ovatæ plus minus acutæ infra medium adfixæ. *Calcar* corollæ labium inferius interdum parum excedens. *Stylus* brevis. *Semina* speciei hujus notabilia et quoad sciam peculiaria sunt.

4. U. DIANTHA (*Rœm. et Sch. Syst. Veget.* i. 169, non *A. DC. Prodr.* viii. 21). Scapo gracili 2–4-unc. vel gracillimo duplo triplove longiore 1–2-floro rarius 3-floro, bracteis parvis amplexicaulibus obtusissimis, pedicellis erectis infimo florem 2–3-plo excedente, calcycis lobis ovatis obtusis subrotundatisve corollæ labio superiore integro late ovato-quadrato v. subrotundato calcarique dimidio brevioribus, calcari cylindrico-conico corollæ labium inferius subæquante v. excedente, capsula subglobosa stigmate minuto sessili, seminibus peltatis alatis 5–6-angulatis.—*Wight, Icones,* t. 1569.

U. biflora, *Roxb. Fl. Ind.* i. 43, non *Wall. Cat.* 1498.—U. Roxburghii, *Sprengel, Syst.* i. 52.—U. elegans, *Wall. Cat.* 1502.—U. pterosperma, *Edgew. Proc. Linn. Soc.* i. 352.—U. Saharunporensis, *hb. Royle.* Conf. U. exoleta, *R. Br.*

Loc. India bor.-occ. *hb. Hook.*! Ludihana, *Edgew. in hb. Bth.*! Nipalia, *Wall.*! Khasia, *J. D. H. et T. T.*! Bengalia, *Roxb. in hb. Mus. Brit.*! Coromandel, *Kœnig*! Quilon, *hb. Wight*!

Parva. *Axis demersus* subramosus segmentis foliaceis capillaceis utriculiferis. *Scapus* nudus v. squamis (1–2) minutis instructus; scapi uniflori bractea vacua sæpe cum axi abortivo v. flore tardo potius ei opposita observatur. *Calyx* lobis parum inæqualibus capsula matura valde brevioribus. *Corolla* labio inferiore integro calcaris basin amplectente eodemque sæpius breviore. A summo corollæ labii superioris ad apicem calcaris 2–3 lin.

The occurrence of an apparently abortive axis or flower-bud on the single-flowered scapes opposite to the bract is, in this plant, as in *U. gibba,* &c. (North American sp.), especially frequent. It is an interesting instance of a secondary superseding a primary axis, and of a definite inflorescence in a group in which an indefinite raceme prevails.

5. U. minor, *Linn.*

Loc. In Tibetia occidentali. Nubra, alt. 11,000 pedum, *T. Thomson*!

Folia demersa di- trichotomo-multipartita utriculifera segmentis linearibus lineari-subulatisve remote subtiliter spinulosis glabrisve. *Scapus* erectus 3–10 unc. (sæpius 4–8 unc.) pauci- multiflorus squamis 2–3 minutis bracteisque basifixis ovatis auriculatis plus minus obtusis instructus. *Pedicelli* post anthesim sæpius arcuato-patentes v. adscendentes calyce 2–4-plo longiores. *Calyx* lobis subæqualibus ovatis obtusis superiore corollæ labio superiore ovato subrotundatove integro breviore. *Corolla* labio inferiore late elliptico obovato-rotundato vel suborbiculato superius 2–3-plo excedente, calcari brevissimo saccato obtusissimo.

A basi calycis ad extremum corollæ labii inferioris 3–4 lin.

It may be proper here to state that I do not admit the specific value of *Utricularia Bremii* (Heer), and doubt further if the *U. intermedia* of British botanists be distinct, except as a mere form or perhaps variety, from *U. minor*, L. It is not improbable that the *U. sacciformis* of Benjamin (*Linnæa*, xx. 302) may refer to this plant; I have not, however, seen authentic specimens.

§ II. *Scapus basi foliis linearibus, lineari-spathulatis v. spathulatis, integris, ante florescentiam sæpe evanescentibus. Calyx lobis æqualibus, interdum parum inæqualibus.*

A. *Scapus squamis, bracteis bracteolisque basifixis instructus.*

a. *Glabra. Calcar conico-subulatum v. subulatum, dependens, sæpius plus minus curvatum. Calyx fructifer, lobis capsulam obtegentibus.*

* *Flores violacei, purpureo- v. albo-cærulei.*

6. U. ALBO-CÆRULEA (*Dalz. in Kew Journ. Bot.* viii. 279). Floribus paucis, pedicellis floriferis erectis subpatentibusve calcar subæquantibus fructiferis curvato-deflexis, calycis lobo superiore late ovato acutissimo corollæ labio superiore albo suborbiculato integro emarginato v. retuso marginibus reflexis breviore, lobo inferiore calcari dependente subulato acuto sæpius valde breviore, labio inferiore corollæ amplo subintegro v. emarginato calcar plerumque duplo excedente.

Loc. Concan, *Stocks*! (In rupibus prope Vingorla, fl. temp. pluviali, *Dalz. l. c.*)

Fragrans (fid. *Dalz. l. c.*). *Radices* sparse ramosæ, utriculis paucis. *Scapus* 3–10 unc. (sæpius 4–5 unc.), teres, erectus, firmus gracilisve, squamis raris parvis ovatis instructus, 1–2-florus, nonnunquam elongatus 4–5-florus. *Bracteæ* ovatæ acutæ. *Flores* primum approximati. *Corolla* labio inferiore (fide descript. opt. *Dalz. l. c.*) quadrato-orbiculari emarginato, palato macula pallida venosa antice 3-lobata notato. Capsula globosa v. sacciformis calycis lobis accrescentibus pedicello demum leviter decurrentibus obtecta. *Stigma* sessile. *Semina* minuta, oblonga v. ovata, utrinque obtusa v. subsphærica, scrobiculato-reticulata.

Corolla a summo labii superioris ad apicem calcaris 4–6 lin., a basi calcaris ad extremum labii inferioris 4–7 lin.

Ab *Utriculariis* alteris affinibus, floribus paucis, corollæ amplæ albo-cæruleæ labio inferiore calcar valde excedente, pedicellis fructiferis denique curvato-deflexis, dignoscitur.

7. U. ARCUATA (*Wight, Icones*, t. 1570–1). Floribus paucis, calycis lobis subæqualibus superiore paulo majore late ovato v. cordato-ovato corollæ labio superiore suborbiculato obovato-orbiculato v. obcordato

integro v. plus minus profunde emarginato breviore, lobo inferiore ovato calcari 3–4-plo breviore, corollæ labio inferiore amplo integro rarius emarginato calcar longum gracile lineari-subulatum dependens v. falcato-curvatum subæquante.

a. Corollæ labio superiore bilobato, calcari dependente, pedicellis calcar vix excedentibus.

β. Corollæ labio superiore suborbiculato integro subintegrove, calcari sæpius arcuatim curvato, pedicellis florem æquantibus v. paulo excedentibus.

Loc. a. Bombay, *Jacquemont* (565 [a]).

β. Malabar, *Law*! Concan, *Stocks*! Belgaum, *Law*!

Flores cærulei (*Wight, Icones, Not.* [a] 1571); mihi corollæ (in specc. exsicc.) labium inferius deorsum pallide violaceum palatum flavum (?) versus pallescens videtur. *Radices* ramosæ utriculiferæ. *Folia* brevia, lineari-spathulata v. spathulata, obtusa, utriculis nigris interdum instructa, sub anthesin pauca nullave. *Scapi* 3–10 unc. (sæpius 3–5 unc.), erecti, nonnunquam bifidi, squamis paucis (2–3) minutis ovatis. *Pedicelli* fructiferi, adscendentes v. arcuato-patentes, apicem versus leviter marginati. *Capsula* ovata v. elliptica, stigmate sessili v. subsessili. *U. albo-cœrulea* et *U. affini*, quibus proxima est, calcari gracillimo corollæ labium inferius æquante, distinguitur.

Planta Jacquemontiana forsan ad speciem distinctam pertinet.

8. U. AFFINIS (*Wight, Icones,* t. 1580. f. 1). Scapo pauci- multifloro, pedicellis brevibus plus minus arcuato-adscendentibus vix patentibus nunquam deflexis, calycis lobis subæqualibus superiore late ovato v. orbiculato-ovato acutissimo v. cuspidato, inferiore ovato calcari subfalcato dependente conico-subulato acuto v. acutiusculo valde breviore, calycis fructiferis lobis plus minus rotundatis apiculatis acutiusculis v. obtusis, lobo majore sæpius suborbiculato orbiculato-cuspidatove, corollæ violaceæ v. cæruleæ labio superiore obovato-cuneato subobovato vel late oblongo integro emarginatove calyce paulo breviore v. longiore, labio inferiore integro v. emarginato calcar sæpius subæquante, seminibus plus minus profunde scrobiculatis.

a. Scapo sæpius 3–8 unc. floribus primum paucis postea 5–7, pedicellis calycem subæquantibus, corollæ labio superiore sæpius plus minus obovato emarginato v. integro. Corolla a summo labii superioris ad apicem calcaris sæpius 3–4 lin., a basi anteriore calc. ad extremum labii inferioris 1½-3 lin.—*U. decipiens,* Dalz. Kew Journ. Bot. iii. 279; conf. *U. acuta,* Benj.

β. Scapo 1½–4 unc. 1–4-floro, pedicellis brevissimis bracteam vix excedentibus, labio corollæ superiore obovato emarginato. A summo corollæ labii inferioris ad apicem calcaris 3–4 lin., a basi calcaris anteriore ad extremum corollæ labii inferioris 1½–2 lin.—*U. brachypoda,* Wight, Icones, t. 1578–1. Præcedentis vix varietas, forma mera parva. Cf. *U. graminifolia,* MSS. *β.* Nov. Cambria (Cape Grafton), 1770, in hb. Mus. Brit.

γ. Scapo majore erecto v. subvolubili 6 unc. ad ped. et ultra 3- multifloro, foliis gramineis linearibus v. lineari-spathulatis obtusis, pedicellis fructiferis calycem æquantibus sæpius remotis, corollæ labio superiore oblongo v. subobovato integro v. subintegro. Petala cærulea albo lineata (fid. *not. in hb. Griff.*).—*U. Griffithii*, Wight, Icones, t. 1576; *U. intricata*, hb. Griffith.

Loc.:—*a*. Concan, *Dalz.*! *Stocks*! *Law*! In montibus Nilghiri, *Wight, hb*! Maulmein, *Lobb, hb. Hook.*!—*β*. Quilon, *hb. Wight*!—*γ*. Malacca, *hb. Wight*!

Distr. Borneo ins., *Barber*!

Radices parce utriculiferæ. *Folia* ante anthesin plerumque decidua, in var. γ. nonnunquam persistentia, sæpe 1–1½ lin. lata. *Scapi* sæpius erecti teretes, squamis paucis bracteisque ovatis ovato-lanceolatisve, pedicellis plerumque subremotis remotisve. *Capsula* ovata v. elliptica, stigmate subsessili.

Characteres diagnostici formis speciei hujus communes, in colore scapi &c. (in specc. herb.) pallide viridi, pedicellis brevibus suberectis v. curvato-adscendentibus, calycis loborum fructiferi forma plus minus rotundata acuta, et seminibus sæpe profunde scrobiculatis, inveniuntur. *U. graminifolia* (Nov. Cambria, *Banks et Solander*), MS. in hb. Mus. Brit., forsan ad eandem referri debet.

9. U. CÆRULEA (*Linn. herb.*, non *A. DC. Prodr.* viii. 19). Scapo firmo v. gracili erecto v. subvolubili 2 unc. ad ped. et ultra (sæpius 3–8 unc.) 1–8-floro, squamis paucis (in var. β. valde numerosis) bracteisque ovatis sæpius acuminatis, pedicellis fructiferis gracilibus erectis adscendentibus v. laxe adscendenti-patentibus nunquam deflexis calycem demum æquantibus v. excedentibus, calycis lobo superiore ovato acuminato corollæ labio superiore obovato oblongo-obovato v. orbiculato-obovato (in var. γ. angustiore oblongo obtuso) integro breviore vix longiore, calycis fructiferi lobis ovatis acutis v. acuminatis, seminibus minutis reticulato-striatis.

a. Scapo firmo v. gracili 2–8–10 unc., racemis denique elongatis floribus remotis remotiusculisve, pedicellis fructiferis calycem æquantibus v. excedentibus erectis v. erecto-patentibus, labio superiore corollæ sæpissime obovato, inferiore plerumque plus minus adscendente.—*U. pedicellata*, Wight, l. c. t. 1578. f. 2; *U. conferta*, Wight, l. c. t. 1575.

β. Scapo sæpe firmiore squamis ovatis acutis numerosis instructo, floribus paucis subterminalibus, pedicellis rectis calycem subæquantibus. —*U. squamosa*, Wight, l. c. t. 1579 (an forma tantum?).

γ. Elongata. Scapo gracili v. volubili, pedicellis gracilioribus laxe adscendenti- v. arcuato-patentibus, corollæ labio superiore angustiore, &c.—*U. uliginoides*, Wight, l. c. t. 1573.

Loc.:—*a*. In montibus peninsulæ: Concan, *Stocks*! *Law*! Nilghiri, *Foulkes*! *Schmid*! Pulney, *hb. Wight*! Courtalam, *hb. Wight*! In Ceylonia (*C. P.* 2086), *Thwaites*!—*β*. Sispara, *hb. Wight*!—*γ*. Courlam, *hb. Wight*!

Species variabilis, formis extremis valde dissimilibus. *Folia* spathulata v. lineari-spathulata plerumque ante anthesim evanescentia. *Scapus* squamis raris ovatis acutis acuminatisve (excepta var. β) instructus, firmus, debilis v. subvolubilis. *Flores* quam in *U. reticulata*, *U. albo-cærulea*, et *U. arcuata* minores, corollæ labio inferiore integro sæpius adscendente calcar conico-subulatum subæquante.

Pedicellis gracilibus plus minus adscendentibus vix marginatis calyce fructifero rarius brevioribus plerumque longioribus, corollæ labio superiore integro et sæpissime obovato, dignoscitur. (*U. Smithiana*, herb. Wight, mihi forma præcedentis major videtur.)

10. U. RETICULATA (*Smith, Exot. Bot.* 119). Scapo ped. et ultra volubili v. breviore firmo erecto, calycis lobo superiore ovato acutissimo cuspidatove corollæ (excl. var. β) amplæ labio superiore ovato obtusissimo v. ovato-rotundato integro marginibus reflexis breviore (in var. β idem æquante v. paulo superante), calcari subulato dependente, calyce fructifero accrescente marginibus pedicello deflexo (v. in forma β patente) sæpius decurrentibus.

Species magnitudine scapi florumque valde variabilis: sub tribus modificationibus occurrit. *Folia* linearia, ante anthesin sæpius decidua. *Corolla* cærulea v. violaceo-cærulea, labio inferiore faucem versus pallido v. albido nervis coloratis longitudinaliter et transverse striato, calcari pallido v. albido.

a. Scapo 6 unc. ad ped. et ultra sæpissime volubili squamis bracteisque ovatis acutis acuminatisve instructo, pedicellis fructiferis patentibus v. sæpius deflexis apicem versus marginatis calycem æquantibus v. interdum 3–4-plo excedentibus, floribus remotis remotiusculisve, calycis lobis fructiferis valde accrescentibus, sæpe 3–4 lin. latis, late ovatis acutis, corollæ labio superiore ovato apice rotundato v. ovato-orbiculato integro calycis lobum superiorem superante et marginibus reflexis fere obtegente, labio inferiore amplo galeato integro v. emarginato calcar rectum v. vix curvatum subulatum acutum æquante v. sæpius valde excedente, capsula ovata v. elliptica calyce accrescente obtecta, seminibus ovatis oblongisve striatis reticulato-striatisve.

Corolla magna, a basi calcaris ad extremum labii inferioris (in herb. sp.) sæpe 6–8 lin.—*A. DC. Prodr.* viii. 19; *Wight, Illust.* ii. t. 143; *Rheede, Hort. Mal.* ix. t. 70; *Wall. Cat.* 1493.—U. cærulea, *hb. Heyn.*, *Wall.*

Forma occurrit cum scapo erecto v. volubili 3–8 unc., floribus paucioribus. An plantæ typicæ forma junior? *U. spiricaulis*, Miq. Pl. Hohen. 574.; *U. uliginosa*, Wight, Icones, t. 1574 (in parte).

β. (*stricticaulis*). Scapo erecto firmo 2–5 unc. nonnunquam longiore, squamis plus minus acutis, pedicellis fructiferis marginatis calycem accrescentem æquantibus v. brevioribus bracteam paulo excedentibus, adscendentibus vel deflexo-patentibus, calycis lobis denique ellipticis acutis deorsum angustatis.

Corolla, quam in forma typica, valde minor, labio superiore calycem

æquante v. breviore, inferiore calcar subæquante, calcari calyce breviore vix longiore. *U. cæruleæ* interdum non parum similis, sed corollæ labio superiore calyce breviore, habitu firmiore, pedicellis sæpius brevibus firmis distinguitur.—*U. cærulea*, var. *stricticaulis*, Kœnig in hb. Mus. Brit.; *U. uliginosa*, Vahl, En. Pl. i. 203.; *U. humilis*, Heyn., Wall. Cat. 1495; *U. polygaloides*, Edgew. l. c. 351.

Loc. :—*a.* In Ceylonia, *Walker*! (C. P. 2090) *Thwaites*! (sub nom. *U. cæruleæ*) *Macrae*! Nilghiri, *Lobb*! Malabar, *Pl. Hohen.*! Mysore, *Buchan.*, *hb. Mus. Brit.*! Concan, *Stocks*! *Law*! Forma *U. spiricaulis*, Miq. (v. supra). Prope Mangalore, *Pl. Hohen.*! Quilon, *hb. Wight*! Concan, *Stocks, &c.*! Ceylonia (C. P. 2091), *Thwaites*!—*β* (*stricticaulis*). In Ceylonia, *Walker*! (C. P. 2088) *Thwaites*! Coromandel, *Kœnig, &c.*! Mysore, *hb. Wall.*! Bengalia, *Edgew.*

11. U. SCANDENS (*Benj. MS. in hb. Hook.* (in parte), *non Linnæa*, xx. 309). Scapo tenuissimo volubili squamis paucis minutissimis ovatis instructo, pedicellis remotis subremotisve sæpe brevissimis v. calycem æquantibus, fructiferis plerumque deflexis, calycis lobis paulo inæqualibus superiore breviore ovato-orbiculato corollæ labium superius obtusissimum integrum v. subemarginatum subæquante, lobo inferiore ovato calcari conico-subulato dependente paulo breviore, calycis fructiferi lobis obtusis obtusiusculisve capsulam ovatam v. ellipticam subæquantibus.

U. minima, gracillima. *Scapus* 1–4 unc. sæpe volubilissimus. *Bracteæ* minutæ, ovatæ, subacutæ v. obtusæ. *Flores* cærulei, plerumque remoti, pedicellis brevibus vel fructiferis calycem subæquantibus. *Stylus* brevis. *Semina* minuta, reticulato-striata, scrobiculata.

A summo corollæ labii superioris ad apicem calcaris circiter 2 lin.; calyx fruct. $1\frac{1}{4}$–$1\frac{3}{4}$ lin. longus.

Loc. Prope montes Maduræ, Madras, *hb. Wight*!

Formæ minori *U. Wallichianæ* (quacum a Benj. confusa est) similis, sed calcycis lobis fructiferi plus minus obtusis parum inæqualibus, pedicellis deflexis, corollæ colore, &c. ab eadem dignoscitur.

In the 'Linnæa' (vol. xx. p. 309), Benjamin describes a *Utricularia* under the name of *U. scandens*, quoting as a synonym '*U. volubilis*' of the Hookerian herbarium. Referring to this collection, I find a sheet upon which are mounted two very distinct species of *Utricularia*. To each of these is a label attached bearing the name '*U. scandens*, Bj.,' I believe, in the handwriting of its author. To the specimens of one of these species the name *U. volubilis*, quoted by Benjamin, had been previously affixed: it is to this plant, moreover, that his description applies; and from these specimens it was most probably framed. These latter, however, are obviously referable to the voluble and slender variety of *U. Wallichiana*, Wight, while the other examples belong to the very different plant which I have here described, additional specimens of which were met with in Dr. Wight's herbarium. I have thought it better not to import a new specific name for the species,

trusting that, if this explanation be accepted, the old one may be retained.

** *Flores flavi.*

12. U. BIFIDA (*Linn. herb.*). Scapo sæpius erecto 2–10 unc. 2- multifloro, squamis paucis, pedicellis brevibus marginatis fructiferis nutantibus bractea brevioribus v. parum longioribus, calycis lobo superiore ovato v. ovato-rotundato obtusiusculo corollæ labio superiore quadrato-oblongo ovato subobovatove integro paulo breviore, lobo inferiore ovato obtuso v. bidentato calcari breviore, corollæ labio inferiore integro v. emarginato calcari dependente paululo falcato-curvato breviore v. subæquante, capsula sæpius globosa v. ovata calycis lobis accrescentibus demum ovato-rotundatis obtusis obtecta, seminibus plerumque ovatis oblique striatis.

U. biflora, *Wall. Cat.* 1498.—U. antirrhinoides, 1498 *b*.—U. diantha, *A. DC. Prodr.* viii. 21.—U. Wallichiana, *Bj. Bot. Zeit.* 1845, 213.—U. humilis, *Wight, l. c.* t. 1572. f. 2. (U. humilis, *Vahl. En. Pl.* ?)

Loc. In Ceylonia, *Walker*! *Wight*. Malabar et Mysore, *Wight*. Chittagong, *J. D. H. et T. T.*! Silhet, *hb. Wall.*! Nipalia, *Wall.*! Tavoy, *Wall.*! Malacca, *Griff. hb. Wight*!

Distr. China, *Nelson, in hb. Mus. Brit.*! Ins. Philip., *Cuming*, No. 2289 (sec. *Benj. in Linnæa*, xx. 303); sp. nova, *U. brevicaulis*, Bj., sphalmate, *hb. Hook*!

Scapus squamis bracteisque ovatis plus minus acutis instructus. *Radices* fibrosæ, parce utriculiferæ. *Folia* lineari-spathulata, sub anthesin nulla subnullave. *Capsula* globosa v. ovata, stylo brevi.

Ab omnibus affinibus satis diversa; discrepat corollæ colore flavo, calycibus fructiferis obtusis nutantibus pedicello brevi denique plus minus decurrentibus.

13. U. WALLICHIANA (*Wight, Icones*, t. 1572. f. 1 (male), non *Benj.*). Scapo stricto v. volubili firmo v. gracillimo 1–2- multifloro, floribus remotis subremotisve, pedicellis erectis adscendentibusve calcar subæquantibus interdum longioribus laxe patentibus, calycis lobis subæqualibus, fructiferis accrescentibus ovatis acutis v. cuspidatis, floriferis superiore late ovato v. ovato-orbiculato cuspidato v. acuminato corollæ labium superius plus minus obovatum v. rotundatum integrum (in var. γ submarginatum) subæquante, calcari subulato dependente sæpe falcato-curvato corollæ labium inferius integrum v. subretusum plus minus excedente v. æquante, calycis lobo inferiore calcari interdum 2–3-plo longiore (in var. γ æquilongo v. parum longiore).

β. Scapo gracili v. capillaceo sæpe volubili, floribus remotis pedicellis adscendentibus patentibusve.—*U. scandens*, Benj. Linnæa, xx. 309, &c.

γ (*firmula*). Scapo 1–3-unc. 1–3 floro, corollæ labio superiore integro v. subemarginato, calcari calycem sæpe parum excedente.

Loc. In regione temperata montium peninsulæ, Himalaya &c.—α. Courtalam, *Wight*. Madras, *hb. Wall.*! Khasia, *J. D. H. et T. T.*!

Sikkim, inter *Sphagna*, alt. 9000 ped., *J. D. H.*!—β. In montibus Nilghiri, *hb. Wight*! Courtalam, *hb. Wight*! Sirra Mullay, *hb. Wight*! Arcot, *Hunter, hb. Hook.*! Khasia, *J. D. H. et T. T.*!—γ. Khasia, *J. D. H. et T. T.*! Sikkim ad Lachoong, alt. 10–11,000 ped., *J. D. Hooker*!

Radices utriculiferæ. *Folia* per anthesin subnulla, linearia v. lineari-spathulata, in var. γ petiolis interdum utriculiferis. *Scapus* squamis 1–4 minutis ovatis v. ovato-lanceolatis acutis instructus (*U. macrolepis*, Wight, l. c. t. 1580. f. 2), forma cum floribus (?) abortivis squamis scapi suffultis). *Bracteæ* acutæ v. acuminatæ. *Pedicelli* sæpissime erecti v. erecto-patentes, fructiferi apicem versus calyce decurrente plus minus marginati, floriferi calcar æquantes v. excedentes. *Calyx* lobis ovatis superiore latiore acutissimo cuspidatove, inferiore acuto v. minute bidentato calcari sæpius valde breviore. *Corolla* aurea flavescensve, labio superiore (var. γ excepta) integro. *Capsula* ovata v. elliptica, stigmate sessili, seminibus minutis striatis v. reticulato-striatis.

Forma typica a summo labii corollæ superioris ad apicem calcaris 4–5½ lin.

b. *Calcar cylindricum vel conico-cylindricum, plus minus porrectum.*

* *Scapus, &c., pilis laxe patentibus hirtus.*

14. U. HIRTA (*Klein, in hb. Willd.? vide Link, Jahrbuch*, i. 55.) Scapo gracili 1–6 unc. sæpius 1–2-floro, pedicellis bracteis calycibusque laxe subpatentim pilosis v. pilosiusculis, pedicellis brevissimis bracteam vix excedentibus, corollæ labio superiore obovato oblongo-obovato v. quadrato-oblongo integro obtusissimo calycem sæpius duplo excedente, calcari conico v. conico-cylindrico adscendente v. porrecto corollæ labio inferiore plus minus longiore, capsula matura calycem subæquante.

U. setacea, *Wall. Cat.* 6398, non *Michx.*

Loc. Khasia, *J. D. H. et T. T.*! Hb. Madras, *in hb. Wall.*!

Scapus erectus debilisve, raro triflorus, sæpe uniflorus, squamis paucis bracteis bracteolisque angustis lineari-subulatis subulatisve. *Calyx* lobis æquilongis ovatis obtusiusculis. *Stigma* sessile. *Semina* minuta reticulata.

Corolla cærulea v. purpurea, venosa, faucem versus et in calcari albida v. flavescens. A basi calycis ad apicem calcaris porrecti 2–3½ lin.

Ab *U. racemosa* et affinibus, quibus habitu similis, scapo calycibusque laxe hirtis, ceterisque valde diversa primum distinguitur.

From the small number of specimens of the Wallichian *U. setacea* which I have seen, and their rather imperfect condition, I may err in determining it to be identical with the Khasia species. Of the latter, however, I have had an abundant series through my hands; and upon these my description rests.

** *Scapus glaber.*

15. U. CAPILLACEA (*herb. Wight, Wall. Cat.* 6399). Species mihi non optime cognita. Scapo tenuissimo 1–2 unc. interdum bifido sub anthesin foliis nullis, squamis paucis minutis, floribus 1–3, pedicellis brevissimis bracteam ovatam v. lanceolatam acutam æquilongis v. parum excedentibus, calycis glabri lobis ovato-rotundatis vix acutis, superiore majore corollæ labio superiore breviore, labio inferiore corollæ (3-lobato v. integro?) calcari cylindrico porrecto obtuso breviore.

Loc. ——?

Incerta: corollæ color, labiorum corollæ forma.

B. *Scapus squamis bracteisque basi-volutis; capsula calycem subæquans vel excedens.*

a. *Pedicelli fructiferi capsula non breviores, sæpius longiores; bracteolæ nullæ; capsula calycem superans.*

16. U. VERTICILLATA (*Benj. in Linnæa*, xx. 312). Scapo 8–12 unc. erecto 4- multifloro, pedicellis floriferis fructiferisque adscendenti-patentibus, calycis lobis subæquilongis obtusissimis v. superiore obtusiusculo subrotundato, corollæ (flavæ?) labio superiore calycem excedente, inferiore calcar dependens subcylindraceum v. cylindrico-conicum subæquante v. paulo breviore, capsula erecta globosa, seminibus minutis scrobiculatis.

U. bifida, *Wight, l. c.* t. 1584. f. 2.

Loc. Malacca, *Griff. hb. Wight*! *Hook.*! &c.

Radices fibrosæ, parce utriculiferæ. *Folia* ante anthesin plus minus decidua. *Scapus* sæpe bifidus v. subramosus, ramis erectis, squamis bracteisque plus minus utrinque acutis v. basi obtusiusculis. *Pedicelli* fructiferi capsula sæpe longiores, cæsio-puberulenti. *Stigma* sessile v. subsessile.

Corollæ color et forma labiorum incerta sunt; planta tamen ab affinibus satis distincta, et characteribus præcedentibus facile dignoscitur.

b. *Pedicelli brevissimi, cum bractea subæquilongi. Squamæ et bracteæ mediofixæ, utrinque acutæ; bracteolæ minutæ v. bracteam æquantes. Calyx lobis minute puberulis. Corollæ calcar plus minus porrectum.* (Nigrescentes.)

* *Corollæ calcar labio inferiore non longius.*

17. U. ROSEA (*Edgew. Proc. Linn. Soc.* i. 352). Scapo 4 unc. ad ped. erecto gracili v. firmo 2- multifloro, squamis paucis pluribusve, floribus subremotis approximatisve magnitudine valde variabilibus, calycis purpurei lobis ovato-rotundatis subæqualibus, superiore corollæ labio superiore rotundato obtusissimo integro plus minus breviore, calcari

porrecto crasso cylindrico-conico v. cylindrico obtusissimo labio inferiore breviore eodemque plus minus obtecto.

U. racemosa, *Wight, l. c.* t. 1584. f. 1; *Benj. in Linnæa,* xx. 307.—U. cærulea, *A. DC. Prodr.* viii. 19.

Loc. In Bengalia, *Edgew.* Ceylonia, *Walker*! *Gardner*! (C. P. 2085) *Thwaites*! Montibus Pulney, *hb. Wight*!

Radices fibrosæ, utriculis paucis nullisve. *Folia* spathulata v. lineari-spathulata, ante anthesin sæpe evanescentia. *Scapus* interdum bifidus. *Pedicelli* brevissimi, bracteam æquantes v. parum excedentes, bracteolis minutis lanceolatis a basi plus minus volutis. *Corolla* (purpurea v. rosea?) labio inferiore cucullato striis 4 latis pulchris notato (fide sched. in hb. Hook.) calcar obtegente. *Capsula* globosa v. subglobosa, calycem æquans v. parum excedens, seminibus minutis. *U. racemosa* (Wall. Cat. 1496) varietas? cf. *U. complanatam,* Wall. Cat. 1497.

U. rosea, Edgew., is known to me solely from the description in the 'Proceedings of the Linn. Soc.' (*l. c.*); I may therefore err in referring to the same form the plant occurring in the South and Ceylon, As noted above, perhaps both may be forms of *U. racemosa,* Wall. Cat. 1496, although I scarcely consider them as such.

** *Corollæ calcar labium inferius excedens.*

I desire especially to draw the attention of Indian botanists to the forms which group themselves under this subsection. Notwithstanding the extensive suites of specimens illustrative of most of these, together with the other aids which have been freely and most liberally afforded me, I feel myself, after devoting no little anxious care to their study, quite unable satisfactorily to adjust or subordinate them. While, on the one hand, I fear to unite them under one presumed species (the extreme forms of which, however, would by no means present structural differences irreconcilable with the reasonable adoption of such a course), on the other, from the variability of those parts which alone can afford characters not common to the whole series, I cannot, with a fair confidence, say between which groups a line may be most suitably drawn. Therefore, although I incline to the opinion that there may be of these two (or perhaps three) species, under existing circumstances I have thought it the safer course to pursue, to indicate merely the groups which I conceive may not improbably be of specific value, without, however, positively attributing such import to them.

Characteres omnibus communes.

Folia lineari-spathulata v. spathulata. *Scapus* erectus, debilis vel subvolubilis, floribus paucis v. numerosis. *Calyx* lobis subæqualibus ovato-rotundatis rotundatisve, superiore sæpe obtusiusculo v. subapiculato corollæ labio superiore integro v. emarginato plerumque breviore. *Corolla* labio inferiore cucullato integro v. subintegro calcaris

porrecti basin amplectente. *Capsula* globosa v. subglobosa, calycem æquans v. parum superans, stylo brevissimo, seminibus numerosis minutis.

18. U. RACEMOSA (*Wall. Cat.* 1496). Scapo erecto v. nonnunquam debili 2 unc. ad ped. et ultra (sæpius 6–12 unc.) 1- 2- multifloro, calycis lobo superiore inferiorem parum excedente, labio corollæ superiore subovato ovato-oblongo v. quadrato-ovato plus minus abrupte obtuso integro v. subemarginato calycis lobo superiore sæpe duplo longiore, labio inferiore corollæ calcari porrecto crasso subcrassove conico-cylindraceo v. conico plus minus obtuso v. oblique obtusiusculo breviore, capsula globosa calycis lobos subæquante.

Loc. Chittagong, *J. D. H. et T. T.*! Silhet, *hb. Wall.*! Ceylonia, *Walker*! Maulmein et Mergui, *Griff. hb. Hook.*! &c.

Flores magnitudine valde variabili. Corolla in exemplis e montibus Khasiæ purpurea (fid. *sched. J. D. Hook.*).

Utricularia (e Concan, *Stocks coll.*) floribus paucioribus 1–5 (sæpius 1–3), scapo 2–6 unc., corollæ labio superiore plus minus oblongo v. elliptico-quadrato obtuso integro calycis lobo superiore ovato-rotundato v. rotundato subapiculato longiore.

Corollæ recentis color incertus. An forma *U. racemosæ*, Wall.?

19. U. NIVEA (*Vahl* (?), *Wall. in Rxb. Fl. Ind. ed. Carey*, i. 144, ex *Wall. l. c.*). Scapo suberecto circiter 6 unc. filiformi interdum bifido fructifero elongato volubili, floribus parvis 4–8, corollæ labio superiore brevi lineari emarginato, inferiore calcari conico adscendente fere duplo breviore, capsula globosa.

Loc. In oryzetis prope Serampore.

Corolla alba palato flavescente.

20. U. FILICAULIS (*Wall. Cat.* 1501). Scapo filiformi erecto 2–4 unc. paucifloro, calycis lobis subæqualibus ovato-rotundatis obtusis v. superiore obtusiusculo, corollæ labio superiore integro v. emarginato (ex descr. A. DC. "oblongo obtuso integro") quam calycis lobus superior vel parum longiore vel breviore, calcari porrecto cylindraceo v. cylindrico-conico quam lobus inferior non parum longiore.

Loc. Tavoy, *W. G. hb. Wall.*!

Utricularia scapo erecto capillaceo 1–4 unc. 1–4-floro, calycis lobis æqualibus subæqualibusve, superiore ovato-rotundato subapiculato v. obtuso, inferiore subrotundato, corollæ labio superiore lanceolato v. oblongo integro obtuso calycis lobum superante, inferiore cucullato integro, calcari conico-cylindrico vel fere subulato porrecto v. adscendente, capsula subglobosa calycem æquante v. superante, stylo brevi, seminibus minutissimis obsolete reticulato-striatis.

Loc. In montibus Khasiæ, *J. D. H. et T. T.*!

Corolla pallida lilacina (fid. *sched. cum sp.*). An ad *U. filicaulem*, Wall., referri debet?

Indeterminatæ (Nigrescentes).

U. squamosa, *Bj.* (*Bot. Zeit.* 1845, 212).
U. paucifolia, *Bj.* (*Linnæa,* xx. 309).
U. obtusiloba, *Bj.* (*l. c.* 312).
U. albiflora, *Griff.* (*Notulæ,* iv. 168).

§ III. *Folia sub anthesin persistentia, reniformia, orbiculata v. orbiculato-spathulata. Calyx lobis valde inæqualibus, inferiore minore. Corolla labio inferiore non galeiformi plus minus lobato.*

Plantulæ e rosula foliorum stolones v. ramulos graciles repentes utriculiferos sæpe emittentes. (*Semina sæpe* (*semper ?*) *appendiculata, pilis elongatis v. spinulis* (*cellulis testæ productis*) *capitatis glochidiatisve plus minus instructa.*)

A. *Folia reniformia v. orbiculato-reniformia.*

21. U. BRACHIATA (*sp. nova*). Scapo nudo gracillimo erecto v. adscendente 2–4 unc. sæpius 1-floro rarissime 2-floro, foliis reniformibus gracili-petiolatis, corollæ labio inferiore quinque-lobato, lobis lateralibus superioribus divergentibus linearibus obtusis, lobo inferiore centrali valde latiore subquadrato rotundatove plus minus abrupte obtuso.

Loc. In Himalaya orientali temperata, prov. Sikkim, Lachen, inter muscos, alt. 8–11,000 ped., *J. D. Hooker* !

Species elegans. *Radix* fibrosa, ramulis repentibus gracilibus interdum parce utriculiferis. *Folia* petiolis basin versus gracillimis. *Bractea* minuta, basi-soluta v. adnata, pedicellum gracilem calcar v. florem æquantem gerens, cum bracteolis lanceolatis v. latioribus, acutis v. obtusis, v. minute denticulatis. *Calyx* purpureus, lobo superiore late orbiculato emarginato v. retuso (forsitan interdum integro) lateribus inflexis lobum inferiorem obovatum valde excedente. *Corolla* alba, labio inferiore infra faucem macula flava notato, superiore minimo bilobato v. profunde emarginato laciniis obtusis v. minute emarginatis calycis lobum superiorem æquante v. paulo breviore, corollæ labii inferioris lobi laterales inferiores sæpius distincti, obtusi, nonnunquam vix prominentes. *Calcar* dependens v. subcurvatum, lineare, obtusum, calycis lobum inferiorem 3–4-plo excedens, corollæ labio inferiore brevius.

Folii reniformis lamina cum petiolo sæpe $\frac{1}{2}$–$\frac{3}{4}$ unc. longa, corollæ lobis superioribus labii inferioris plus minus linearibus divergentibusque, ab *U. orbiculata* dignoscitur.

A basi calcaris ad extremum corollæ labii inferioris 3–4 lin. Folia interdum 2–3 lin. lata.

B. *Folia orbiculata v. orbiculato-spathulata.*

22. U. ORBICULATA (*Wall. Cat.* 1500). Foliis orbiculatis orbiculato-

spathulatisve petiolatis, scapo tenuissimo 2–4 unc. 2–4-floro interdum elongato multifloro (8–12), corollæ lilacinæ labio superiore brevissimo minute bilobato bidentatove calyce breviore, inferiore quinquecrenulato-lobato lobis obtusis æqualibus subæqualibusve v. interdum lobulis duobus superioribus majoribus tribus inferioribus minoribus, calcari dependente lineari-subulato labium inferius æquante, seminibus ovatis ovato-oblongisve cellulis productis glochidiatisve testæ plus minus armatis.

U. glochidiata, *Wight, l. c.* t. 1581. (U. striatula, *Sm.*?)

Loc. In Ceylonia, *Gardner*! *Walker*! *&c.* Cochin, *Johnstone*! Concan, *Law*! Khasia, *J. D. H. et T. T.*! Nipalia, *Wall.*! Tavoy, *in hb. Wall.*! Maulmein, *Lobb*! (Forma lobis corollæ labii inferioris distincte inæqualibus) Maulmein, *Parish*! Prope Malacca, *Griff. herb.*!

Pulcherrima. *Scapus* nudus v. squamis (1–2) minutis basi-solutis instructus. *Pedicelli* calcari longiores v. breviores, fructiferi sæpe laxe patentes v. dependentes. *Calyx* lobo superiore late rotundato plus minus emarginato v. integro capsulam globosam parum superante, inferiore valde minore suborbiculato ovato demum deflexo.

Corolla lilacina, fauce flavo (fid. *sched. Parish*).

Corollæ labium inferius basi 2–4 lin. latum, nonnunquam latius, magnitudine valde variabile.

I am unable to satisfy myself of the identity of this plant with the *U. striatula* of Smith, from the imperfect examples preserved in the Smithian herbarium or the British Museum. If they be not the same species, they are certainly very closely allied, as already noted by Benjamin, who, indeed, quotes Smith's name as synonymous with *U. orbiculata*. Benjamin is certainly in error in describing the lower lip of the corolla in the latter plant as 4-lobed.

23. U. MULTICAULIS (*sp. nova*). Cæspitosa, scapo firmo nudo 1–2 unc. 1–3-floro, foliis orbiculato-spathulatis petiolatis, pedicellis ante anthesin sæpius cernuis per anthesin tamen erectis, corollæ carneæ labio superiore brevissimo semi-orbiculato integro emarginatove, inferiore 4-lobato vel 3-lobato lobo inferiore centrali plus minus profunde emarginato, interdum sub-6-lobato lobulis duobus lateralibus superioribus sæpe dentiformibus subnullisve, calcari crassiusculo dependente conico-cylindrico obtusiusculo labio inferiore sæpius breviore.

Loc. In Himalaya orientali temperata, prov. Sikkim, locis paludosis, Lachen, alt. 11,500 ped., Lachoong, 6-7000 ped., *J. D. Hooker*!

Species minima, cæspitose crescens. *Scapi* stricti, fere robusti, conferti, pedicellis subcrassis fructiferis erectis v. cernuis calyce sæpe 3–4-plo longioribus. *Bractea bracteolæque* minutæ lanceolatæ v. oblongæ, vix acutæ, basi-solutæ. *Calyx* lobo superiore late rotundato primum integro, postea (a læsura ?) sæpissime bilobato v. bidenticulato, inferiore obovato-orbiculato emarginato v. minute denticulato. *Corolla* carnea, fauce flavescente (ex *sched. J. D. H.*), lobulis labii inferioris sæpius

plus minus angustis oblongisve nunquam patenti-divergentibus. *Capsula* globosa, calycem subæquans v. excedens, stylo nullo. *Semina* satis maturata non certe observavi.

A basi calcaris ad extremum corollæ labii inferioris 1–1¼ lin. Scapus sæpius 1–1½ unc. longus.

24. U. FURCELLATA (*sp. nova*). Minima, scapo gracillimo ¼–1½ unc. 1–2-floro, corollæ albæ labio inferiore forma lobata varia sæpius quadrilobato laciniis duabus inferioribus æqualibus obtusis subemarginatisve, superioribus lateralibusque brevibus obtusis interdum minutis subnullisve (labio tunc bilobato), calcari dependente subulato quam calycis lobus inferior 3–5-plo longiore labium corollæ inferius æquante v. excedente, seminibus pro planta tantula magnis ovatis ad extremitatem crassam cellulis testæ productis glochidiatis v. capitatis instructis.

Loc. In montibus Khasia, Boga Panee, *J. D. H. et T. T.*! Prov. Sikkim, Lachen, ad rupes humidas, *J. D. H.*!

Folia orbiculata, petiolata. *Scapus* rarissime 3-florus, nudus, bracteis bracteolisque minutissimis ovatis oblongisve acutis obtusisve basi vix solutis. *Pedicelli* graciles, calcari breviores v. longiores. *Flores* parvi, albi. *Calyx* lobo superiore late orbiculato sæpe emarginato lobum inferiorem oblongum v. obovatum apice interdum denticulatum valde excedente. *Corolla* labio superiore calyce breviore plus minus bilobato v. emarginato, inferiore 2- v. 4-lobato vel (segminibus inferioribus plus minus coalescentibus) subtrilobato. *Calyx* fructiferus, lobo inferiore denique sæpius deflexo. *Capsula* calyce brevior. A summo calycis lobi superioris ad apicem calcaris 1½–2 lin.

Formam majorem notavi (in coll. Darjiling, "*E. I. C.*") 1–3-floram, calcari longiore, corolla lobo inferiore calyci æquilongo v. paulo excedente, foliisque late orbiculatis.

Ab affinibus dignoscitur calcari dependente subulato recto v. vix curvato acuto, corollæ labio haud 5-lobato, seminibus et foliorum forma.

25. U. KUMAONENSIS (*Oliver*). Minima, scapo ½–2 unc. 1–3-floro, foliis orbiculatis orbiculato-spathulatisve petiolatis, corollæ labio inferiore 5-lobato, lobo centrali valde latiore subquadrato emarginato v. integro, lobis lateralibus parvis linearibus v. lineari-oblongis obtusis plus minus divergentibus, calcari dependente subcylindraceo v. cylindrico-conico obtuso obtusiusculove quam labium inferius paulo breviore, capsula subglobosa calycem æquante v. subæquante, seminibus (ut in præced.) magnis testæ cellulis sæpe papillæformibus e seminis apice plus minus longe capillaceo-productis.—*Diurospermum album* (Edgew. in Linn. Proc. i. 351) verisimiliter conjungi debet (vide obs. supra).

Loc. In Himalaya occidentali temperata, Pilti fl., alt. 7,500 ped., *Strachey et Winterbottom*! (? *Diurosp. album* "super rupes madidas in Vishnu Gangetis valle," alt. 8,000 ped., *Edgeworth, l. c.*)

Pedicellus infimus demum patens v. adscendens, calyce 2–3-plo longior. *Bracteæ bracteolæque* minutissimæ, a basi vix solutæ. *Calyx* lobo superiore suborbiculato corollæ labium superius excedente, inferiore valde minore subrotundato calcari 2–3-plo breviore. A basi posteriore calcaris ad extremum corollæ labii inferioris 1–2- lin.

Ab *U. brachiata* (cujus semina matura non certe vidi) differt, foliorum forma præsertim, statura minore, et a ceteris sectionis hujus seminibus longe-appendiculatis vel corollæ labii calcarisque forma.

Utriculariæ Indicæ mihi non satis cognitæ.

26. U. MINUTISSIMA (*Vahl*). Scapo capillari 2–3 unc., squamis raris bracteisque (ut mihi videtur) basifixis, floribus parvis paucisque subremotis, pedicellis brevissimis bracteam æquantibus v. parum excedentibus, calycis lobis vix æqualibus subobtusis.

Loc. Malacca (*in hb. Smith.* vidi).

27 (?). UTRICULARIA (Madras coll. No. 52). Habitu *U. reticulatam* revocans, differt corollæ labio superiore ovato elliptico vel subrotundato marginibus reflexis *emarginato*, calcari labium inferius *æquante* v. interdum non parum *excedente*.

That this paper may embrace all the Indian members of the natural order *Lentibulariæ*, I append to the foregoing monograph of the *Utriculariæ* a notice of the only species of *Pinguicula* hitherto discovered in India.

PINGUICULA, *L.*

1. P. ALPINA, *L.*

Loc. Himalaya alpina; Sikkim, alt. 10,000–13,000 ped., *J. D. Hooker*! (? Kumaon, alt. 11,000, ped., *Strachey et Winterbottom*). Planta Kumaonensis (exempla fructifera tantum, *in hb. Hook.* vidi) verisimiliter ad speciem eandem pertinet.

The occurrence of this plant in the Himalaya is an interesting extension of its area towards the south and east.

Regarding the *P. flavescens* of Flörke as a form of the same species, we may trace it from the north of Scotland, through Scandinavia, and Northern and Central Russia, to the Urals, and the vicinity of Lake Baikal. At more considerable elevations it crosses Europe from the Pyrenees, through the Alps, Austria, &c.

I do not discover any material difference between Dr. Hooker's specimens, aided by a coloured drawing from the fresh plant, and the European series of *P. alpina* in the Hookerian herbarium. The Sikkim specimens are almost or quite glabrous, of the stature of *P. vulgaris*, and with pale yellowish-white flowers, bearing a yellow spot in the throat.

On Five New Plants from Eastern Peru. By RICHARD SPRUCE, Esq. Communicated by GEO. BENTHAM, Esq., V.P.L.S.

[Read March 3rd, 1859.]

I. WETTINIA ILLAQUEANS, *a new* PALM *from the Peruvian Andes.*

Among the many interesting plants discovered by M. Pœppig in his downward journey from the sources of the Huallaga to the mouth of the Amazon, none was more remarkable than the undescribed Palm which he gathered "in Transandine Peru, in the beautiful shady woods which border the northern bank of the river Tocache," and which was afterwards published by himself and M. Endlicher under the name of *Wettinia augusta.* Its place in the system was considered doubtful by Endlicher, who left it at the end of *Pandaneæ*, with the remark that it afforded a passage from Screw-pines to Palms, and would perhaps be ultimately reckoned among the latter. I have been on the look-out for this plant from the day of my entering the forests of the Huallaga; and though I have not yet seen the original species, nor have reached within 100 miles of Pœppig's locality for it, I have found what is obviously a second species of the same genus, which has enabled me to decide that *Wettinia* must definitively be stationed among the true Palms. I have been so many years away from books, that I know not how botanists now-adays distribute the genera ascribed to Screw-pines by Endlicher and Kunth; but I believe that the American have been separated from the Eastern genera, and, as it appears, with perfect justice. In fact, the American plants, formerly referred to as Screw-pines, seem to me to constitute two distinct orders, each of equal value with *Palmaceæ* and *Pandanaceæ*, viz. 1st, *Phytelephantaceæ*, which are (so to speak) palms with an inferior ovary; and 2nd, *Cyclanthaceæ*, whose inferior ovary alone separates them from Arads. *Wettinia*, however, is far removed from both these; the fruits are superior, and though so densely crowded on the spadix as to suggest the inferior concrete fruits of *Phytelephas*, there is no real resemblance to the latter. The habit, the ringed stems, the male and female flowers, the structure of the ovary and fruit, are in every respect as in Palms. *Wettinia Maynensis*, like *W. augusta*, has entirely the aspect of an *Iriartea*. The straight, smooth, ringed stem, of 30 to 40 feet high, is supported on a cone of emersed prickly roots 3 feet in height; the petioles are dilated into long,

tubular, entire sheaths; and the broad pinnæ are præmorse, and cut at the extremity. It differs notably from the Iriarteas, in the short spadices, so densely clad with hairy fruits as to have suggested to the prurient imagination of the Peruvians the name by which this palm is known in Maynas—*Púllo-coróto* (i. e. "testiculi hirti").

Wettinia Maynensis differs from *W. augusta* chiefly in the more numerous pinnæ (38–40 pairs, while in *W. augusta* they are but 18–20 pairs), and in the spadices, which are only three from one leaf-ring, and put forth 5–8 fastigiate branches at their apex; while in *W. augusta* they are simple, and as many as from 8 to 15 grow from the same ring. There is a further difference, in the spathes, which in *W. Maynensis* are 6 in number, the three outer (corresponding to what are called by Martius in other genera "spathæ incompletæ") much smaller, and persisting on the peduncle in the form of sheaths; while the three inner and larger ones ("spathæ completæ") fall away before the fruit is ripe, or persist only in fragments. In *W. augusta* the spathes are said to be two, and the peduncle is said to be furnished with remote coriaceous sheaths—undoubtedly the remains of the incomplete spathes. In both specimens the sepals vary in number, and the stamens are from 12 to 16, nor does there seem to be much difference in the form of the fruit; but in *W. Maynensis* the arilliform raphe is in every stage thin and papery, while in *W. augusta* it is fleshy. In Endlicher's description, the scale-like external sepals are considered bracts; but as they quite correspond to what are called sepals in other palms, I describe them as such.

On comparing Endlicher's description of the ovary of *W. augusta* with that of *W. Maynensis*, given below, there is an apparent difference, which at first sight might be supposed even generic; but when the two species come to be compared, I expect it will turn out to be no difference at all. In *W. augusta* the ovary is said to be solitary, and the style is inserted "prope ovarii basin eodem cum ovulo latere"—an abnormal position in palms. In *W. Maynensis* the ovaries are 3, concrete at the base with each other and the central style; two of them are mostly sterile, and at the time of ripe fruit might be taken for a mere thickening of the base of the style, along with which they persist, of course laterally to the fertile carpel. I have no doubt that the same structure obtains in *W. augusta*, and that the sterile ovaries are either obsolete or have been overlooked from their minuteness.

From the detailed description of *W. Maynensis*, an idea may be

obtained of the affinities of *Wettinia* among the genera of palms. If we are guided by the triple ovary, then it must be stationed in *Coryphinæ*; but the only genus described by Kunth in this tribe with pinnate leaves is *Phœnix*, which, besides being very different in habit, has the stamens never more than 9, and a sessile stigma on each ovary. But if we be guided by the sum of all the characters, we shall place it next the genus which most resembles it in habit, viz. *Iriartea*. *Iriartea* has the same emersed cone of roots, the obliquely præmorse and incised pinnæ, the numerous stamens; one species (*I. setigera*) has setulose fruit; and a seed of *I. exorrhiza* placed by the side of one of *Wettinia Maynensis*, is scarcely distinguishable—it is veined in the same way by the vessels of the rhaphe, and the embryo has the same position. If the spathes are not the same in number in the two species of *Wettinia*, so also are they different in nearly every species of *Iriartea*; in *I. setigera* they are 4 or 5, in *I. exorrhiza* 5 or 6, and in *I. deltoidea* 10 to 12. Lastly, as the ovaries of *Wettinia* are concrete at the base with each other and the central style, they may, and perhaps ought to, be looked on as a deeply 3-cleft ovary, analogous to the 4-cleft ovary of Labiates; and then the difference from the 3-celled ovary of *Iriartea* will not appear so very great. The character of the spadices of *Wettinia*, previously alluded to, though striking at first sight, does not disturb the affinity with *Iriartea*.

Hence we may either place *Wettinia* in Coryphinæ, and consider it analogous to *Iriartea* in Arecinæ, or, by another classification of the genera of palms, place it actually by the side of *Iriartea*.

Wettinia Maynensis is not unfrequent at the head of valleys in the Maynensian Andes*, both north and south of the river Mayo, at an elevation of from 3000 to 4000 feet, where it grows in company with the Chonta† (*Euterpe oleracea?*), the Tarapoto (*Iriartea ventricosa*, Mart.; the *Paxiuba barriguda* of Brazil), and another *Iriartea*, which is perhaps *I. deltoidea*, Ruiz et Pav.,

* I apply the term "Maynensian Andes" to so much of the eastern slopes of those mountains as was comprehended in the ancient province of Maynas. They are watered by the lower part of the Huallaga till it emerges into the great Amazonian plain through the Pongo of Chasuta, and by some of its principal tributaries, especially by the Mayo, which, taking its rise a little eastward of Chachapoyas, passes Moyobamba and Lamas, and enters the Huallaga near Tarapoto.

† The name "Chonta" is applied in Maynas to two species of *Euterpe*, and also to the *palmito* or terminal bud of all palms.

though, having not yet seen perfect flowers and spathes, I am not certain about it. When the people go to cut palmitos in the time of Lent, they sometimes mistake the *Wettinia* for the Iriarteas, which have edible palmitos, while that of the *Wettinia* is very bitter and may be distinguished from the others by its striped appearance (caused by the vertical imbrication of the young pinnæ), whence it is often called *Shúllu-chonta.* The *Huácara-póna*, or Horn-palm (*I. exorrhiza*, Mart.), though frequent in the moist woods of the plain, I have not yet seen at the same elevation as the palms above-mentioned.

I proceed to give the characters of the two species of *Wettinia*, and a description of *W. Maynensis*, drawn up from fresh specimens. I abstain from offering an amended character of the genus until I shall have an opportunity of examining specimens of *W. augusta*, and perhaps of other species which yet remain to be discovered.

WETTINIA, *Pœpp. et Endl. Nov. Gen.* ii. 39, t. 153 et 154 *a–i*; *Kunth, Enumer.* iii. 109 et 589.

W. AUGUSTA (*P. et E.*). Rhizomate conico e radicibus arcte sibi invicem impositis conflato; pinnis 18–20-jugis; spathis propriis 2; spadicibus simplicibus pluribus (8–15), ex eodem verticillo ortis; rhaphe arilliformi carnosa.

Hab. "In Peruviæ Transandinæ sylvis pulcherrimis obumbrantibus, quibus arcetur ripa borealis fluvii Tocache." (*Pœppig, loc. cit.*)

W. MAYNENSIS (*Spruce*). Rhizomate conico, e radicibus inter se liberis dissitiusculis conflato; pinnis 38–40-jugis; spathis propriis 3; spadicibus apice congesto-ramosis, paucis (sub 3), ex eodem verticillo ortis; rhaphe arilliformi tenui.

Hab. In convallibus Andium Maynensium umbrosis, præcipue secus rivulos, alt. 3000′–4000′, sociis *Iriartea ventricosa* Mart. et *deltoidea* R. et P. (?).

Descr. *Caudex* radicibus strictis subaculeatis e terrâ emersis et in conum 3 pedes altum conniventibus sustentus, erectus, inermis, 30–40-pedalis, diametro 4-unciali, annulatus; annulis latis, spatio 4 unc. sejunctis. *Frondes* 5 v. 6 contemporaneæ, patulæ, ambitu lanceolatæ, obtusæ, basi in vaginam prælongam 3½-pedalem integram subventricosam dilatatæ, glabræ. Rhachis 9½-ped., supra triangularis, subtus semiteres, basi solâ subcanaliculata, et a basi ipsâ pinnata. Pinnæ 38–40 paria, subæquidistantes; infimæ diminutæ; mediæ 3-pedales, latitudine 3-unciali, angulo 40°–50° insertæ, basi semiverticales reduplicatæ cuneatæ, dein dimidiato-lineari-lanceolatæ, apice obtusato- v. truncato-præmorsæ, margine antico apiceque incisæ, dentibus præmorsis subacutisve; venæ plurimæ, basi fere contiguæ, superne magis

dissitæ, et in dentes marginales alternis vicibus excurrentes, subtus prominulæ costæformes, interspatiis plicâ percursis.

Flores monoici, in diversis spadicibus, plerumque tribus (sc. unico ♀, cæteris duobus ♂), ex eodem verticillo ortis*.

♂. *Spathæ* 6: 3 exteriores cuneatæ, vaginæformes, subtrigonæ, 4-unciales, primitus clausæ, apiculatæ, dein apice irregulariter ruptæ, imbricatæ, persistentes; 3 interiores majores, 11×3-unc., e basi angustatâ stipitiformi fusiformes, apiculo brevi compresso obtuso recurvo, pergameneæ, minute crebre striatæ, arcte imbricatæ, pro spadicis emissione laceræ, caducæ; omnes spathæ pilis brevibus appressis fulvescentibus subdeciduis vestitæ. *Spadicis* stipes 6-unc., obsolete trigonus, fere teres, pro spatharum insertione annulatus, annulo supplementario apicali vaginam bilabiatam (quasi spatham rudimentariam) gerente, in ramos subocto, confertos, simplices, 6–unciales, præfloratione sinistrorsum circinatos postea subrectos, teretes, minute pannosos, spiraliter areolatos, floribus dense obtectos, divisus. *Sepala* squamæformia, crassa, rigida, castanea, subpuberula, tuberculis paucis sparsa, æstivatione valvata; *exteriora* 3–5 (plerumque 4), late subulata, obtusiuscula, lineam longa, libera vel nonnunquam duo in unicum bifidum coalita; *interiora* tria, longissima (7 lin.), anguste subulata, subflexuosa. *Stamina* 12–16 (plerumque 13); *antheræ* paullo supra basin in *filamento* brevi (½–1 lin.) subulato compresso positæ, lineares, 4 lin. longæ, obtuse 4-gonæ, 2-loculares, longitudinaliter dehiscentes, pilis albidis flexuosis deciduis vestitæ, connectivo centrali tenui in mucronem curvulum producto; *pollen* globosum læve.

♀. *Spathæ* iis spadicis ♂ subconformes, ancipites tamen, compressulæ, bilabiatim rumpentes, labiis fissis; 3 interiores, fructibus maturatis, caducæ vel eorum reliquia sola persistentia. *Spadicis* stipes subcompressus, 10-uncialis, adscendens, apice decurvus et ramos 5-7 confertos, fere verticillatos, rectos, patulos, 8-unciales, diametro (fructibus inclusis) fere 4-unciali, proferens. *Sepala exteriora* tria, a basi prælatâ triangulari brevi-subulata, 2–3 lin. longa, inter se subinæqualia; *interiora* tria, late subulata, subflexuosa, 5–6 lin. longa. *Ovaria* tria, ovalia, 3½ lin. longa, basi inter se et cum stylo coalita, villosa, 1-locularia, 1 vel sæpius 2 sterilia; ovulum unicum ex baseos angulo interno fere erectum, sessile, anatropum. *Stylus* unicus centralis, 7 lin. longus, subulatus, subtrigonus, villosus, plerumque cum ovariis abortivis ad ovarii fertilis basin persistens, rarius deciduus; *stigmata* tria teretia, erecto-flexuosa, 3 lin. longa. *Baccæ* 1-spermæ, siccæ, in spadice densissime collectæ, pressione mutuâ 3–6-angulari-obpyramidatæ, apice lato convexo, pilis cinereis, basi solidis subfasciculatis, superne continue tubulosis, flexuosis, villosæ. *Pericarpium* molliter lignosum tenuiusculum, apice incrassatum. *Endocarpium* membranaceum

* Spadices, with ripe fruits, are usually found on the fourth ring below the fronds; the other three rings (which are at first very close, but become more distant as the trunk lengthens) have spadices in different stages of growth.

rapheos vasibus adhærens. *Semen* 11×6 lin., anguste ovali-obovatum subtrigonum; *testa* tenuis, firma, nigrescens, a basi ad apicem usque rhaphe tenui percursa et ejusdem vasibus albis complanatis adhærentibus reticulata, cum nucleo connata. *Albumen* æquabile, subosseum. *Embryo* in foveolâ basilari nidulans, conico-cylindricus, ad nuclei centrum directus.

II. Discanthus, *a new genus of* Cyclanthaceæ.

Discanthus, gen. nov. Cyclanthacearum.

Char. Gen.—*Flores* monoici in eodem spadice, in seriebus circularibus, masculis cum fœmineis alternantibus, dispositi. *Spathæ* 4, imbricatæ, deciduæ. *Perigonia* florum fœmineorum discis pluribus distinctis bilamellatis spadicem ambientibus constantia; florum masculorum 0. *Stamina* inter perigoniorum annulos vel discos in ordines quatuor structa; *filamenta* omnia ad medium usque inter se coalita, superne libera, antheram paullo breviorem, innatam, linearem, obtuse 4-gonam, bilocularem, longitudinaliter dehiscentem, gerentia. *Laminæ* cujusque disci in facie interiori ovarium continuum, sectione verticali ovato-lanceolatum, gerentes, supra ovarium concretæ (unde ovarium inferum), apice iterum discretæ; margine reflexo minute serrato, nervo e spadicis axi radiante in dentes singulos excurrente. *Ovula* 00, ovalia vel ovata, anatropa, ad ovarii parietes funiculo æquilongo flexuoso adfixa, pluriseriata. *Styli* tot quot perigonii dentes, iisdem subbreviores, lineares, compressi, medio nervosi, in serie unicâ ad cujusque laminæ faciem interiorem accreti, apice solo brevi-ligulato libero intus stigmatoso. *Fructus* e discis pluribus, carnosis, margine unisulcis, interne ad parietes seminiferis, constans. *Semina* 00, ovata, subgibba, breviter obtuse subapiculata, 12-sulcata, rhaphe angustâ apice incrassatâ semicincta. *Testæ* membranæ tres; externa internaque pellucidæ minute cellulosæ, hæc apice brevi-tubulari; media e reticulis parallelogrammis, oblatis, medio depressis, in series 12 longitudinales catenatim dispositis, formata. *Nucleus* ellipsoideus, basi minute mamillatus. *Embryo* rectus cylindraceus, hilo contiguus, in albuminis carnosi basi nidulans.—Herba Peruviana *acaulis*, frondibus *bipartitis*, *facie* Carludovicæ *vel* Cyclanthi; *ab hoc* perigoniis *circularibus nec spiralibus, et* ovulis *ab initio nudis in ovarium continuum collectis, diversa.*

Discanthus odoratus, *Spruce.*

Hab. In sylvis humidis Andium Maynensium, prope Tarapoto, præcipue ad rivuli fauces *Pongo del Shillicaio* dictas.

Caudex 0. *Frondes* plures, petiolatæ, erecto-arcuatæ, pallide virides, subtus albo-virides, fere ad basin usque bipartitæ; laciniæ 44×7 unc., lineari-lanceolatæ, subacutæ, angulum 15° inter se formantes, costâ mediâ validâ suprà elevatâ subtus convexâ, venis crebris parallelis, *plicis nullis.* *Petiolus* 4-pedalis tenuiusculus, basi solâ dilatatus am-

plexicaulis, dein trigonus, facie inferiore convexus. *Spathæ* 4, secus spadicis stipitis apicem imbricatæ, ovatæ, concavæ; extima apice foliaceo bilobo; interiores sensim minores, acutæ; intima obtusata. *Flores* odorati. *Spadices* subcylindrici, obtusi, superne paullo tenuiores, 3–4 uncias longi; floriferi 13 lineas, fructiferi 18 lineas crassi; stipite tereti 7-unciali. *Disci* 20, floriferi 3½ lineas, fructiferi 6 lineas lati, 1½ lineam crassi. *Semina* vix ¾ lin. longa.

This remarkable plant resembles the *Cyclanthi* and bifid-leaved *Carludovicæ* in habit, but differs from both in the laciniæ of the fronds having a single strong costa (whence they should perhaps be considered conjugate pinnæ), and in being destitute of plicæ. It is nearly allied to *Cyclanthus*, but differs essentially in the perigonium consisting of distinct disks (and not of a continuous spiral) embracing the spadix, and in the ovules being naked from their first appearance (long before the opening of the flowers), and springing on longish funiculi from the very walls of the disk, while in *Cyclanthus* they are at first contained in small pluri-ovulate ovaries, sessile on the walls of the disk in two rows, and finally become confluent. There would seem to be also a difference in the seeds; but though there is a species of *Cyclanthus* in the forests of Tarapoto, I have seen only its young flowers, and Kunth describes the seeds incompletely. The seeds of *Discanthus* are remarkably 12-sulcate, and traversed from base to apex by a narrow rhaphe, which is not arilliform, as that of *Cyclanthus* is said to be. After fecundation, the stamens fall away, and the disks, increasing in thickness, become contiguous. Half-grown ovules had the micropyle still open, and the amniotic sac separable. Great numbers of acicular rhaphides exist in the cells of the funiculus, rhaphe, and testa; at first they are in bundles, but as the seed ripens they break up from each other.

III. YANGUA TINCTORIA, *a new genus of* BIGNONIACEÆ, *whose leaves are used for dyeing blue by the Peruvians of Maynas.*

YANGUA, gen. nov. N. O. BIGNONIACEÆ. Tribus TECOMEÆ.

Char. Gen.—*Calyx* laxus obpyramidato-campanulatus, ore patulo, profunde 5-plicatus, fere ad medium usque in lobos 5 cuspidatos fissus. *Corolla* basi brevi-tubularis, dein campanulata compressa, antice profunde bisulcata, postice trigona; limbo sub-bilabiato, subæqualiter 5-lobo. *Stamina* 4 didynama, cum rudimento quinti, in corollæ tubi apice inserta, corollâ dimidio breviora. *Antheræ* biloculares, loculis divergentibus. *Ovarium* disco impositum, fusiforme, biloculare. *Ovula* 00, secus septi angulos parietales inserta, subsessilia, globoso-oblonga,

anatropa. *Stylus* corollâ subbrevior, *stigmate* e lamellis duabus erectis ovatis crenulatis formato. *Capsula* siliquæformis, magna, lata, compressa, profunde 12-sulcata, bilocularis, bivalvis, ab apice loculicide dehiscens. *Semina* late alata, pluriseriata, septo parallela, arcte imbricata. *Embryo* planus, exalbuminosus; cotyledonibus oblatis, profunde emarginatis, basi cordatis; radiculâ brevi subulatâ hilo proximâ. —*Arbor* Peruviana *humilis*, Tecomæ *affinis*, floribus *tamen virescentibus*, calyce *laxo 5-plicato, et* capsulâ *insigniter* 12-*sulcatâ diversa.*

YANGUA TINCTORIA, *Spruce.*

Hab. Tarapoto locisque aliis Andium Maynensium, passim pro foliis cæruleo-tinctoriis culta, et nomine *Yangua* a Peruvianis insignita. In sylvis nusquam vidi; et ubi terrarum indigena sit, mihi nondum constat.

Arbor 30-pedalis, erecta; cortice profunde sulcato; ramis dichotomis, ramulis obtuse 4-gonis compressulis, faciebus 1-sulcatis. *Folia* opposita, digitata, in petiolo 8-unciali, plano-convexo, apice haud incrassato. *Foliola* 7, in petiolulo subunciali suprà sulcato, terminale majus $5\frac{1}{2}\times 2$ unc., cætera sensim minora, lanceolata vel subobovato-lanceolata, cuspide longiusculâ unciali et ultrà subacutâ, tenuia, pellucido-punctata, glaberrima, siccando nigrescentia; in stirpe juniori nonnunquam supra medium grosse serrata, in adultiori tamen integerrima; venis paucis, angulo 50° e costâ egredientibus, subtus prominulis, longe intra marginem arcuato-anastomosantibus. *Panicula* brevis e ramulorum novellorum dichotomiâ; ramis cymulas 3–12-floras gerentibus; pedicellis basi bracteolatis. *Calyx* albidus, tenuis, fere membranaceus, laxus, corollæ basi multo latior, 5-plicatus, obpyramidato-campanulatus, ore patulo, fere ad medium usque in lobos 5 brevi-ovatos, cuspide abruptâ tenui nervo fere repletâ terminatos, fissus, 8 lineas longus, seriùs subauctus, longe persistens, ante fructûs maturationem tamen deciduus. *Corolla* pallide viridis, minute puberula, intus tomentella, venis plurimis longitudinalibus percursa, $2\frac{1}{2}$ unc. longa, subcurvata, basi tubulari angustâ calycem vix æquante, dein campanulata, compressa, antice profunde bisulcata, postice obtuse 3-gona; limbo sub-bilabiato, 5-lobo, lobis subæqualibus brevi-ovatis obtusatis subrecurvis. *Stamina* corollæ tubi apice inserta, corollâ dimidio breviora; quinti rudimento subulato fertilibus multoties breviori et paullo inferius inserto; *filamenta* basi glandulis brevi-stipitatis obsessa; *antheræ* lineari-oblongæ, loculis divergentibus. *Ovarium* fusiforme, disco impositum. *Ovula* 00, secus septi margines subsessilia, globoso-oblonga, anatropa. *Capsula* viridis, lineari-fusiformis, acuta, compressa, $9\frac{1}{2}$ unc. longa, 25 lin. lata, 12 lin. crassa, angulis 12 elevatis acutis percursa, ex interstitiis canaliculiformibus 12-sulcata, 2-locularis, ex apice loculicide dehiscens; *septa* binata valvis contraria, margine solo inter se coalita, sed a pericarpio crassiusculo lignoso intus lævissimo soluta, seminum delapsorum cicatricibus notata et ideo limam ferrariam haud male simulantia. *Semina* ad lineas plu-

rimas (spatio 2 lin. sejunctas) a septorum marginibus angulo 45° procedentes, sursum directas, sed ad septorum latitudinis vix tertiam partem attingentes, funiculo brevissimo inserta, sc. 4 ad utramque lineam, in laminas 24 septo parallelas colligata, superiora et lateralia inferioribus et interioribus incumbentia, alâ tenuissimâ 2×1 unc. cincta*; nucleo $3\frac{1}{2} \times 3$ lin. obcordato plano. *Testæ* tenuis firmiusculæ membrana exterior in rugas creberrimas irregulariter transversales elevata, interior ab exteriori embryoneque demum separabilis. *Embryo* planus, exalbuminosus; cotyledones oblatæ, profunde emarginatæ, basi cordatæ; radicula brevis, subulata, hilo proxima.

I first saw the tree above described in January 1851, at Janauarí, in the angle between the Rio Negro and Amazon, where it had been raised from seeds brought from Peru; but it had no flowers or fruit; and I did not again see it until I arrived at Tarapoto in June 1855, when I at once recognized it growing in the gardens, and here and there in the open grounds near the town. I have not yet seen it truly wild, nor can I learn whence it was originally brought. It is planted in all the villages I have seen in the Maynensian Andes, and is especially noticeable in the pretty English-looking village of Morales, where it forms scattered clumps on the verdant plain, accompanied by oranges and limes; by the *Ciruelo* (*Spondias*, sp.); the *Siamba* palm (an undescribed *Œnocarpus* with clustered stems); picturesque old *Huingos* (*Crescentia Cujete*), whose branches are hidden by a dense coating of mosses, ferns, and orchids; and several species of terrestrial figs, whose tortuous trunks are enveloped in a network of their own roots. It is a small tree, scarcely larger than *Sambucus nigra*, which it much resembles in its thick cracked bark, though its regularly forked and somewhat rigid branches give it otherwise a different aspect. When out of flower, it might be passed over for a *Tecoma*, to which it is undoubtedly closely allied; but the green flowers, the large lax plicate calyx, and the broad pods traversed by twelve deep furrows are marks that at once distinguish it from that genus. The inhabitants of Maynas dye the cotton cloths of their own manufacture a permanent blue by simply boiling them along with Yangua leaves. About every three months every leaf that can be got at is stripped off; and the trees seem not to suffer from being thus denuded; but they rarely put forth flowers till they grow beyond the reach of spoliating hands.

* *Ala* seminum inferiorum margine plurisinuata; funiculis seminum superiorum, quibus ala rectangularis margine subintegra adest, per sinus alarum inferiorum egredientibus.

It should be mentioned that the name "Yangua" is given also to two species of *Indigofera*, cultivated sparingly at Tarapoto: they are sometimes called "Tacsha-yangua" (or "small Yangua"), to distinguish them from *Yangua tinctoria*, which is the "Atun- (or great) yangua."

IV. CAPIRONA, *a new genus of* RUBIACEÆ. Tribe, CINCHONEÆ.

Char. Gen.—*Calyx* obparabolicus, compressulus, inferne cum ovario connatus, dimidio superiore liber, ore obtuse 5–6-dentato; florum axillarium dente externo plerumque in laminam phylloideam producto. *Corolla* e basi angustâ tubulosâ, campanulata, subgibba, 15–18-sulcata, 5–6-lobata; lobis cordato-ovatis imbricatis, 3 (vel omnibus) demum reflexis, quasi bilabiata. *Stamina* 5 (raro 6) corollâ duplo breviora; *filamenta* basi in tubulum corollæ tubo adnatum coalita, dein libera *antheræ* lineares, connectivo adnatæ, 2-loculares, longitudinaliter dehiscentes. *Ovarium* inferum, biloculare. *Ovula* 00 in placentis elongatis, sectione reniformibus, dissepimento utrinque insertis, sessilia, anatropa. *Stylus* brevis cum stigmate lineari bilamellato tubum stamineum paullo superans. *Capsula* anguste obovata, calycis limbo coronata, ab apice ad basin septicido-bivalvis. *Semina* 00, parva, tenuia, alâ trapeziformi vel triangulari basi sæpius bilobâ cincta. *Embryo* in axi albuminis carnosi orthotropus; *cotyledonibus* parvis ovalibus subplanis; *radiculâ* tereti hilo proxima.—*Arbor* Peruviana *cortice castaneo deciduo, stipulis intrapetiolaribus, floribus magnis Bignonioideis,* Calycophyllo *proxima; huic tamen sunt* flores *multo minores,* corolla *brevi-campanulata symmetrica omnino esulcata, lobis concavis fere fornicatis nunquam reflexis, et* filamenta *corollæ æquilonga cum eâdem ad loborum basin usque concreta, haud in tubulum coalita.*

CAPIRONA DECORTICANS, *Spruce.*

Hab. Tarapoto et aliis locis secus fl. Huallaga, in sylvis primævis recentioribusque, solo arenoso. *Capirona* Peruvianorum dicta est.

Arbor pulchra 30–40-pedalis, apice parce patule ramosa; ramulis subteretibus; cortice castaneo, lævissimo, nitente, lamellis tenuissimis secedente. *Folia* opposita, in petiolo perbrevi 5-lineari, maxima 20 × 10 unc., oblongo-ovalia, apice rotundata vel apiculo brevissimo obtusato terminata, subcoriacea, glaberrima vel in stirpe juniore ad venas et in facie inferiore plus minus pubescentia; venis validis parallelis, angulum 70° cum costâ efformantibus, secus marginem curvatis et anastomosantibus. *Stipulæ* intrapetiolares, 36 lin. longæ, 13 lin. latæ, elongato-triangulari-lingulatæ, acutæ, 2-costatæ, venulosæ, albidæ, submembranaceæ, basi subcordatâ sese imbricantes. *Cymi* ex stipularum superiorum plerumque aphyllarum axillis, subinde paniculam magnam terminalem efformantes; pedunculo 9-unciali v. breviori, apice 3-fido; ramis bis terve bifidis, bracteolâ stipulari ad cujusque rami basin. *Flores* ad ramorum apices axillasque solitarii,

sessiles, ebracteolati, visciduli, subodorati; axillaribus præcocioribus, plerumque (haud semper) dente calycis externo in laminam phylloideam, albidam, 3-costatam, venulosam, convexam, ovalem, obtusatam, 3 × 1½ unc., petiolo 1½-unciali, producto. *Calyx* viridis, obparabolicus, compressulus, obsolete 5-gonus, semuncialis, dimidio superiore libero persistente, ore dentibus 5–6 obtusis. *Corolla* sesquiuncialis, crassiuscula, extus alba roseo tincta, lobis intus sanguineis, e basi brevi-tubulosâ 2½ lin. longâ campanulata, subgibba, 15–18-sulcata, ab apice ultra ⅓ in lobos 5–6 cordato-ovatos æstivatione imbricatos vix parum contortos, 3 vel omnibus seriùs reflexis, quasi bilabiata, fissa. *Stamina* 5, basi in tubulum corollæ tubo adnatum ore pilosum coalita; *filamenta* glabra 3½ lin. longa; *antheræ* filamentis æquilongæ, lineares, obtusæ, connectivo adnatæ, ad corollæ loborum basin attingentes, loculis vix basi productis longitudinaliter dehiscentibus. *Ovarium* inferum, disco epigyno crasso cupulari coronatum, 2-loculare; *ovula* plurima, anatropa, secus placentas incrassatas (sectione reniformi) dissepimento utrinque adnatas apice solo liberas, sessilia, imbricata, angulo 45° ascendentia, tenuia, alâ trapeziformi vel triangulari circumcincta, nucleo minuto infra alæ centrum. *Stylus* brevis cum stigmate lineari profunde bilabiato, intus dense papilloso tubulum stamineum paullo superans. *Capsula* anguste obovata, inferne sensim angustata, 10 × 5 lin., apice disco et calycis limbo brevi coronata, leviter 10-striata, e folliculorum marginibus introflexis axi coadunatis demum ab apice separatis 2-locularis; epicarpium tenue badium; endocarpium cartilagineum albidum. *Semina* 00, parva, badia, alâ membranaceâ ovulorum formâ, basi sæpius bilobâ, apice lacerâ vel laciniatâ, nucleo ovali compresso infra-centrali, constantia. *Testa* membranacea firmiuscula arcte venoso-reticulata. *Embryo* ½ lin. longus, in albuminis carnosi axi rectus; *radicula* teres, $\frac{3}{10}$ lin. longa, hilo proxima; *cotyledones* parvæ, $\frac{2}{10}$ lin. longæ, ovales, subplanæ.

This handsome little tree is very frequent near Tarapoto, where it grows chiefly on the lower hills, in a sandy soil. Its trunk is conspicuous among the other trees, from the shining reddish bark, which is continually peeling off in broad thin flakes. In this respect it quite resembles the Mulatto-tree of the inundated shores of the Amazon, which bears in abundance corymbs of small white flowers scented like those of the hawthorn, and in structure very like those of a *Cinchona*. The latter tree, called also "Capirona" by the Peruvians, but "Páo mulatto" in Brazil, has been proposed by Mr. Bentham as the type of a new genus of Cinchoneæ, under the name of *Enkylista*. *Capirona decorticans* has, however, very slight botanical affinity with Enkylista, and stands much nearer to Calycophyllum, from which it is strikingly distinguished by the *large ribbed flowers*, and the much shorter

stamens *combined at the base into a tube which lines the short tubular base of the corolla*,—although it has the same character, of the outer tooth of the calyx of the axial flowers being produced into a leafy lamina, which gives to *Calycophyllum* its name.

There is some analogy to Bignoniaceæ, in the campanulate subasymmetrical flowers with a short tubular base and an approach to a bilabiate limb. Indeed the flowers remind one much of those of *Henriquezia*, which on its side shows an approach to Rubiaceæ in the inferior ovary. The winged seeds of *Capirona* it has in common with the rest of the Cinchoneæ, and with all true Bignoniaceæ.

Enkylista I have seen along the shores of the Amazon for full 2000 miles. It perhaps extends downwards to the very mouth of the river, and it is said to be still abundant above the mouth of the Huallaga. On the latter river it is frequent; and I have traced it by the streams among the roots of the Andes up to a height of about 2000 feet. *Capirona* grows only on dry ground; and I have not yet seen it at a greater elevation than Enkylista, nor anywhere far from the river Huallaga.

The light tough wood of the *Capirona* renders it very suitable for the beams of houses; and the trees are mostly cut down when they have attained a suitable size; so that it is rare to find a well-grown or a flowering specimen.

There is apparently a second species with subpilose leaves, attenuated at the base and apex, and with paler bark, in which a green tinge is always perceptible. It grows rather higher than *C. decorticans*, and is very abundant at Yurúnaguas on the Huallaga; but as I have never seen its flowers or fruit, and could therefore give only an incomplete character of it, I hesitate to signalize it by a distinct name.

V. Erythrina Amasisa, *a new species with follicular pods.*

Erythrina Amasisa (*Spruce*). Arborea, foliolis ovato-rhombeis glabrescentibus, racemis terminalibus brevibus subpaniculatis, calyce truncato, vexillo anguste ovato complicato carinam gamopetalam incurvam triente superante, alis e calyce exsertis, legumine folliculari.

Hab. Tarapoto, in sylvis montium inferiorum præcipue secus rivulos. *A'ma-sísa** a Peruvianis designata est.

Caudex 80–100-pedalis, basi subdilatatus, superne ramosus; *ramis* haud late patulis; *ramulis* verrucoso-scabris cinereo-tomentellis; *cortice*

* Query—a corruption of "Amor-sisa," *i. e.* "Love-flower"?

lævi, aculeis brevi-conicis pungentibus obsesso. *Folia* pinnatim 3-foliata; *petiolus* 7-uncialis basi incrassatus; *rhachis* 2¼-uncialis; *foliola* in petiolulo semunciali rhombeo-ovata, vix apiculata, subobtusa, juniora pubescentia seriùs glabrescentia; terminale 7½ × 5¼ unc.; lateralia subminora, eorum petiolulo basi glandulâ stipellari brevi-cylindrica, lineam longa, deflexa, cava, ore truncato aperto instructo. *Folia* inferiora majora et longius petiolata sunt. *Stipulæ* minutissimæ squamæformes citò deciduæ. *Racemi* terminales, 2–6-unciales, cinereo-tomentelli, solitarii vel sæpius plures paniculati. *Pedicelli* 5 lineas longi, seriùs elongati, ebracteolati, basi apiceque articulati, decurvo-secundi, ternatim fasciculati, verticillati, nempe quoque verticillo e fasciculis 3 v. 4 constante. *Flores* penduli, magni, speciosi, miniati, graveolentes. *Calyx* obconico-urceolatus, truncatus, puberulus. *Vexillum* anguste ovale, obtusum, 20 lin. longum, primitus complicatum, dein recurvo-explanatum, apice solo haud evoluto, ungue brevi lato. *Alæ* diminutæ, 3-lineares, ovali-spathulatæ, subobliquæ, erectæ, liberæ, margine exteriore paullo supra basin unidentatæ. *Carina* 14 lin. longa, anguste ovata, apice obtuse bidentata, declinata. *Filamenta* ad ⅔ usque coalita, inter se subinæquilonga; *antheræ* parvulæ, oblongo-ovales, paullo supra basin adfixæ. *Pistillum* stamina subæquans; *ovarium* stipitatum, tenue, subteres. *Legumen* 4–5-unciale, latitudine semunciali; *pericarpio* tenui subpuberulo. *Semina* plerumque 2 maturata et in folliculis decisis apertis longe persistentia, 3 lin. longa, 6 lin. lata; *testâ* firmâ tenui.

This is the handsomest tree I have seen in the Maynensian Andes. It is frequent towards the mouth of the hill-streams that enter the Mayo wherever any primitive forest has been left. In the very town of Tarapoto, on the rocky banks of the turbulent Shillicaio, rise here and there magnificent trees of Amasisa, which have been spared the axe of the first settlers—some of them as much as 100 feet high. Twice in the year, viz. in March to April, and in August to September, they are clad with large flame-coloured or vermilion flowers, sometimes with no accompanying leaves, and sometimes with young leaves of the most delicate green, just appearing. I have been delighted to walk by the Shillicaio at sunset and observe the tracery of the crown of the Amasisa, with its copious red tassels, projected on the whitish-blue eastern sky, when the flowers of almost every tree showed a different shade of yellow-red, not, however, paling to yellow on the one hand, or brightening to scarlet on the other. It continues in flower nearly two months at a time; and before it has well done flowering, the ripened follicular pods, splitting up one side only and with the seeds still adhering, begin to strew the ground. The wood is white and softish, and of no use but for firewood. The trunk is

more or less beset with sharp conical prickles, on which account it is constantly selected by the sagacious Troopial (*Cassicus icteronotus*, Swains.) for its long pensile nests,—though, as if doubting that this were sufficient to render them inaccessible, it hangs them on the very point of the outermost twigs. All the species of Troopial I have seen on the Amazon and Rio Negro, show similar foresight in selecting a place where to rear their infant colonies; and the robber who, observing no impediment from below, ventures to climb to their eyry, finds, to his cost, that it is defended by some large wasps' nest, or by hordes of stinging ants.

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OF THE

LINNEAN SOCIETY OF LONDON.

Letter from M. E. BOURGEAU, Botanist to Capt. PALLISER'S British North American Exploring Expedition. Addressed to Sir W. J. HOOKER, F.R.S., F.L.S., and communicated by him.

[Read March 3rd, 1859.]

Fort Garry, Saskatchewan,
June 7th, 1858.

SIR,—As you received the first letter, sent from Fort Garry, I need not detain you with a description of the little collection I was enabled to make, while almost daily upon the rivers and lakes, hemmed in on all sides by dense forests, to the Fort just named.

I commenced my herborizations June 12th, upon the Ile Royale, situated on Lake Superior, where the vegetation had hardly commenced. The Alders and Willows were in flower on the banks of the island, and by their sides large banks of ice still existed under the rocks. This island is thoroughly wooded, and especially with two *Abies* (*alba* and *balsamifera*), *Betula papyracea*, and the *Thuya*. The same day we landed at the entrance of the Kaministoquoiah River, Fort William; but the shortness of the stay did not enable me to make excursions in that place. From that time it was only during the hours of rest and at the portages that I could gather a few specimens; the indifferent accommodation in our boat did not permit of a large collection being made, from the difficulty of preserving it from damp. I have been delighted to learn that you have received the plants in a good state of pre-

servation, and I hope that this year also you will receive a pretty large quantity, and a good number of each species.

As you are geographically acquainted with the route of the expedition, I need not speak concerning the localities through which we have passed; the specimens of plants (none neglected, but many repeated) will prove a better botanical journal of the expedition than all the notes which I might send you from here; nevertheless I have preserved some notes upon the particular places which are woody, if it is important to know them. There is one particular with which it is as well you should be acquainted —it is the geographical extent of the plants in the countries through which we have travelled; that is to say, the same species occupies a surface from 300 to 400 leagues. The prairies are well covered with plants, of the *Gramineæ* and *Cyperaceæ* in abundance, but of few species. Three distinct localities are to be met with in these prairies—the ordinary plains, marshes and streamlets, and dry rising grounds. Each of these three localities has its peculiar vegetation; but let each locality occur where it will, it presents the same plants throughout. The greater part of the plants at Fort Garry and Pembina are the same as those of Carlton; and it is my conviction that they extend close to the mountains. My collections of 1857, and a portion of those of 1858, you will receive this year; and I give you here the number of boxes which are addressed to you—two from Fort Ellice, containing the collections from Pembina, and some parcels of seeds. This collection is superb, and contains the plants gathered at the most southerly part of our voyage—viz. from the great prairie of the Tortue Mountain, and in the neighbourhood of the river at Souris, to Fort Ellice, where I remained some time, and was consequently able to make a careful collection of the *Compositæ*, which are in perfection from August 15th till the close of the season.

From Fort Ellice our route lay direct to Saskatchewan, the greater part of which is what we in Europe would call pasturage. It is indeed pasture-land, covered with buffaloes, and the grass being so constantly browsed does not attain any height. The country also seems very dry: there are some lakes, but few marshes. There are no forests; but, beside some streamlets, a few small copses of *Populus tremuloides*, which appear to have been spared from fires. The borders also of the Saskatchewan river at l'Elbow are wooded in some places with *P. balsamifera, grandidentata, tremuloides, Fraxinus*, and *Betula pumila*. In the marshy

localities, tufted Willows, interspersed with other shrubs, constitute a covert for deer, and specially for the bear, whose principal food, during the month of September, is the fruit of such shrubs as the *Shepherdia argentea*, which I have seen in large quantities in his stomach.

We arrived at Carlton on the 8th October, and there I finished putting in order my last collections, containing a quantity of seeds, besides the botanical specimens, and filling in all one case. There are 166 packets of different seeds, several shells, and some insects, which I beg you will keep until I return, to make the catalogue. Of this spring's collections, I send two cases—one containing the botanical packets, and the other some objects for your Economical Museum; and several diseases of plants, occasioned by the punctures of insects, for Dr. Hooker. In one of the boxes you will find some animals' skins and birds' eggs, which also I beg you will take care of till my return: each article is furnished with a ticket. As the news I looked for by the arrival of the Captain did not come, I shall be obliged to pass another winter at Edmonton, and I trust, by the following spring, to be enabled to visit those parts of the Rocky Mountains lying nearest this locality; and thus I shall have all the spring plants, which by arriving too late this season I run the chance of losing. It is well known that August is the most suitable month for traversing the mountains; and, besides, the *Compositæ* and seeds of many plants are not perfect till that season.

The total number of cases which you will receive in 1858 is—2 from Fort Ellice, and 3 from Carlton, making 5 in all.

I am anxious to reach the mountains as soon as possible. It is now two seasons since I saw any mountains resembling the Alpine chains of my native country.

Dr. Hooker, to whom I desire my respectful remembrances, will receive at the same time all the observations which I have taken since I left Carlton. I have a journal, in which I have notes upon the temperature of the trees, upon the weather, and on various circumstances; and, lastly, upon the vegetation, and specially upon a certain tree, which puts forth its leaves a month later, which I should like to know the cause of. I desire to do my utmost in rendering the voyage as useful to science as possible.

Accept, sir, every assurance of esteem from your humble servant,

E. BOURGEAU.

I have given special attention to the collection of *Salices* made

at Carlton: the species are not numerous, for which reason I have collected both male and female specimens of each plant, and have been careful to put corresponding numbers on each sex. There are a good many duplicates; therefore I trust you may have as many specimens as will enable you to study them satisfactorily. I regret not being able to send you the leaves of the *Salices*; they are not yet developed. During the third week of last month, the catkins of *P. balsamifera* have been frozen and have fallen off; several other plants, also in flower, have been frozen, and thus for a week I have been deprived of my excursions.

Observations referred to in the foregoing Letter, on the Temperature of the Earth and of Forest-trees, made at Fort Carlton, on the Saskatchewan.

Date.	2 feet.	3 feet.	Populus.	Abies.	Atmosphere.
1857.	°	°	°	°	°
Nov. 1	39·0	41·0	....	....	37·5
2	39·0	41·5	....	....	27·0
3	39·0	41·5	....	....	36·0
4	39·0	40·5	....	....	....
5	39·0	40·0	....	....	....
6	39·0	40·0	....	....	26·0
7	38·0	39·7	....	....	25·0
8	37·5	39·0	....	....	15·0
9	37·0	39·0	....	....	21·5
10	37·0	39·0	....	....	15·0
11	37·0	39·0	....	....	25·0
12	36·5	38·5	....	....	26·0
13	36·0	38·0	....	....	25·0
14	36·0	38·0	....	....	31·0
15	36·0	38·0	....	....	22·0
16	35·5	37·5	....	....	31·7
17	35·0	37·0	....	....	29·0
18	35·0	37·0	....	....	22·0
19	35·0	37·0	....	....	2·0
20	34·7	36·7	....	....	34·0
21	34·5	36·5	....	....	+ 1·0
22	34·0	36·0	....	....	3·0
23	33·7	36·0	....	....	24·0
24	34·0	36·0	....	....	14·0
25	33·5	35·5	....	....	10·0
26	33·0	35·0	....	....	13·0
27	33·0	35·0	....	....	25·0
28	33·0	35·0	....	....	18·0
29	33·0	35·0	....	....	13·0
30	33·0	35·0	....	....	12·0
Dec. 1	33·0	35·0	....	....	17·0
2	32·5	35·0	17·0	....	13·0
3	32·0	34·0	9·0	....	− 1·0
4	32·0	34·0	7·0	....	10·5
5	32·0	34·0	11·0	....	17·0
6	32·0	34·0	12·0	....	15·0

TABLE (*continued*).

Date.	2 feet.	3 feet.	Populus.	Abies.	Atmosphere.
1857.	°	°	°	°	°
Dec. 7	32·0	34·0	− 1·0	....	−14·6
8	31·5	34·0	+ 7·0	....	+ 4·0
9	31·0	34·0	5·0	....	+ 0·2
10	31·0	34·0	7·0	....	7·0
11	31·0	34·0	7·0	....	6·5
12	31·0	34·0	8·0	....	15·0
13	30·5	33·0	12·0	....	13·0
14	30·5	33·0	5·0	....	− 1·0
15	30·5	33·0	14·0	....	+29·0
16	30·5	33·0	15·2	....	+19·0
17	30·5	33·0	6·5	....	5·0
18	30·0	33·0	10·0	....	10·0
19	30·0	33·0	16·5	....	20·3
20	30·0	32·9	16·0	....	19·8
21	29·2	32·6	11·0	....	14·0
22	29·2	32·6	24·0	23·7	36·0
23	30·0	32·6	16·0	....	10·0
24	29·9	32·0	8·0	24·0	0·0
25	29·2	32·0	3·5	4·0	+11·0
26	29·0	32·0	8·2	9·0	26·5
27	29·0	32·0	6·0	14·0	5·9
28	28·5	32·0	5·0	14·0	10·0
29	28·5	32·0	12·4	8·0	15·0
30	28·0	32·0	10·0	15·0	15·0
31	28·0	32·0	5·0	11·0	− 7·0
1858.					
Jan. 1	28·0	32·0	....	5·5	+2·0
2	28·0	31·7	9·0	8·2	31·7
3	28·0	31·7	28·0	28·0	43·0
4	28·0	31·8	....	22·5	3·0
5	28·0	31·8	7·5	9·0	2·9
6	28·0	31·8	− 9·9	−20·0	−23·0
7	26·5	31·5	− 9·2	−20·0	−12·2
8	25·2	31·5	− 7·5	−12·0	− 3·0
9	24·8	31·0	− 6·0	−15·0	+10·0
10	24·6	31·0	....	+ 4·2	− 0·2
11	24·2	30·5	+ 2·5	....	+ 1·0
12	24·2	30·5	− 8·6	....	−23·0
13	24·2	30·5	−13·2	....	−31·0
14	24·2	30·5	−22·0	....	−17·2
15	24·2	30·0	−13·0	− 25??	−17·0
16	22·5	29·2	− 8·0	....	−31·5
17	22·0	29·2	− 7·0	− 5·0	− 4·3
18	22·0	28·1	+12·2	+ 6·5	+20·5
19	23·0	28·1	....	+12·0	+15·9
20	23·0	28·0	+ 6·0	+ 8·0	+14·5
21	23·0	28·0	4·6	6·0	4·5
22	23·2	28·0	14·0	9·5	7·0
23	23·5	28·0	4·5	5·0	− 2·3
24	23·2	28·0	− 2·0	8·0	− 7·7
25	22·5	27·6	....	....	− 5·2
26	22·0	27·4	4·0	....	− 9·3
27	22·0	27·4	....	....	+ 0·8
28	21·8	27·0	....	....	−13·0
29	21·5	26·2	2·0	−10·0	+ 8·0
30	21·1	26·0	4·0	− 5·5	− 3·0
31	21·0	26·0	16·0	+10·0	+ 8·0

I have made some remarks on the temperature of trees in my journal.

Extremes of Atmospheric Temperature (Maximum and Minimum) for every Twenty-four Hours.

Date.	Max.	Min.	Date.	Max.	Min.	Date.	Max.	Min.
1857.	°	°	1857.	°	°	1858.	°	°
Nov. 12	4·2	30·2	Dec. 9	0·0	6·9	Jan. 4	− 1·0	28·0
13	9·0	27·2	10	−16·7	9·2	5	−14·1	7·0
14	12·8	33·0	11	4·7	16·0	6	13·0	25·0
15	18·0	35·0	12	5·0	33·0	7	−22·9	− 3·1
16	20·8	34·4	13	8·0	27·0	8	−13·0	− 0·2
17	11·2	31·0	14	− 1·5	12·0	9	−10·9	18·9
18	− 4·2	15·0	15	4·0	35·0	10	− 2·1	14·0
19	0·0	14·5	16	− 4·0	24·6	11	−15·0	18·0
20	10·2	41·1	17	−10·0	8·1	12	−34·0	−15·0
21	0·3	6·0	18	0·0	19·6	13	−40·0	−15·0
22	2·0	11·1	19	13·0	26·0	14	−14·0	26·2
23	11·9	34·0	20	12·1	21·0	15	−29·2	− 1·3
24	10·0	25·5	21	3·0	24·0	16	−11·4	− 1·3
25	9·1	28·0	22	24·2	41·0	17	− 6·2	15·3
26	10·0	30·0	23	6·0	23·8	18	5·2	26·1
27	22·8	26·2	24	−14·0	5·5	19	6·2	15·3
28	15·2	22·0	25	− 2·0	15·2	20	2·6	24·5
29	13·8	17·5	26	5·0	32·0	21	− 2·2	16·7
30	12·5	17·0	27	− 7·0	14·6	22	5·2	22·0
Dec. 1	14·9	18·9	28	− 6·9	14·9	23	−11·6	4·5
2	5·5	17·0	29	− 2·2	32·2	24	−14·5	22·0
3	− 4·9	8·0	30	8·0	18·5	25	− 8·9	13·3
4	− 5·5	17·2	31	− 7·0	19·8	26	−13·8	1·0
5	5·2	16·2	1858.			27	−12·3	5·0
6	1·5	23·0	Jan. 1	− 3·5	21·9	28	−14·7	5·0
7	−13·0	5·0	2	5·1	40·0	29		
8	2·0	8·5	3	29·0	45·0			

Continuation of the Observations on the Temperature of the Earth and of Forest-trees, made at Carlton, on the Saskatchewan.

Date.	2 feet.	3 feet.	Populus.	Abies.	Atmosphere.
1858.	°	°	°	°	°
Feb. 1	21·8	26·0	....	15·0	2·0
2	21·8	26·0	− 7·0	−12·0	− 9·9
3	21·0	25·8	− 2·5	....	0·0
4	21·0	25·6	....	+ 7·0	+25·8
5	21·0	25·3	....	20·5	26·0
6	21·0	25·0	15·5	18·5	11·3
7	22·0	25·8	....	− 3·5	−14·3
8	21·0	25·8	− 4·2	−15·0	−11·2
9	20·7	25·2	−13·0	....	−25·0
10	19·4	25·0	−20·0	....	−22·0
11	18·2	24·5	−24·0	....	−23·7
12	17·5	24·0	−25·0	....	−27·3
13	15·0	24·0	....	−20?·0	−29·3
14	14·2	23·1	The mercury shrunk into the bulb.		−36·0
15	13·5	21·5			−32·3
16	11·7	21·0			−15·3
17	11·5	20·4	− 9·5	−14·0	− 8·7
18	....	....	....	....	− 6·0
19	13·0	19·4	....	....	− 7·4

TABLE (*continued*).

Date.		2 feet.	3 feet.	Populus.	Abies.	Atmosphere.
1858.		°	°	°	°	°
Feb.	20	....	....	....	− 2·0	− 3·0
	21	....	....	....	....	− 7·5
	22	15·0	20·0	+ 4·0	− 5·0	− 2·0
	23	....	....	....	+19·5	+37·0
	24	17·1	20·6	....	+16·5	30·8
	25	Thermometers frozen.				35·3
	26					30·3
	27					6·6
	28			+ 7·5	0·0	....
Mar.	1	19·8	23·0	7·0	....	1·0
	2	18·8	23·0	....	6·3	1·0
	3	18·0	22·6	12·5	....	17·2
	4	18·8	22·0	....	11·0	22·0
	5	19·0	22·2	21·5	....	26·2
	6	19·8	22·2	....	26·0	33·2
	7	20·7	22·2	28·6	29·5	32·5
	8	23·0	23·5	31·0	....	31·5
	9	24·0	24·5	30·0	....	16·0
	10	....	....	....	24·2	....
	11	24·8	24·8	28·0	28·0	28·2
	12	25·0	25·2	....	26·0	38·7
	13	25·8	25·8	29·5	....	30·0
	14	26·0	26·0	28·0	....	31·0
	15	26·5	26·5	32·2	....	38·5
	16	26·8	26·8	32·0	32·0	....
	17	27·0	27·0	32·0	....	28·0
	18	27·7	27·2	31·0	26·3	31·0
	19	27·8	27·8	31·0	The thermometer of the *Abies* was withdrawn on account of the thawing of the river, which it was necessary to cross to the other side.	43·3
	20	28·0	28·0	30·8		32·8
	21	28·0	28·0	26·0		21·2
	22	28·0	28·0	27·2		31·9
	23	28·0	28·3	31·2		35·7
	24	28·5	28·6	31·8		42·0
	25	28·8	28·9	31·8		37·8
	26	28·8	29·0	32·0		32·2
	27	29·0	29·0	32·0		38·2
	28	29·0	29·0	32·0		44·7
	29	29·4	29·0	32·5		28·1
	30	29·5	29·0	33·0		40·3
	31	29·8	29·6	35·0		39·0
April	1	29·8	29·6	32·0		....
	2	29·8	29·7	32·5		32·8
	3	29·8	29·7	32·0		26·9
	4	29·8	29·7	32·0		28·6
	5	30·0	29·8	31·7		28·3
	6	30·0	29·8	33·0		40·0
	7	30·0	30·0	33·8		39·4
	8	30·0	30·0	32·5		36·1
	9	30·0	30·0	33·5		40·0
	10	30·0	30·0	34·5		42·9
	11	30·0	30·0	33·0		49·8
	12	30·2	30·0	34·5		48·4
	13	30·2	30·0	34·0		....
	14	30·2	30·0	....		26·2
	15	30·2	30·0	32·0		16·0
	16	30·3	30·2	32·0		25·4
	17	30·3	30·2	....		28·3

TABLE (*continued*).

Date.	2 feet.	3 feet.	Populus.	Abies.	Atmosphere.
1858.	°	°	°		°
April 18	30·5	30·5	32·0	....	43·0
19	30·6	30·5	35·0	....	42·0
20	30·7	30·6	36·0	....	44·0
21	30·7	30·6	....	....	43·0
22	30·8	30·7	34·5	....	36·0
23	30·8	30·7	37·5	....	32·0
24	30·8	30·7	....	....	42·0
25	30·9	30·8	34·5	....	45·0
26	31·0	30·8	....	....	44·0
27	31·0	30·8	....	....	54·0
28	31·0	30·8	47·8	....	41·0
29	31·2	30·9	54·0	....	53·9
30	31·2	30·9	....	....	....
May 1	31·3	30·9	59·0	....	68·5
2	31·6	30·8	....	....	48·0
3	32·0	31·0	59·0	....	61·0
4	32·2	31·0	In flower.	....	56·5
5	32·3	31·0	49·0	....	42·0
6	32·4	31·0	52·0	....	52·0
7	32·5	31·0	54·2	....	54·0
8	32·7	31·0	....	....	50·0
9	33·0	31·0	....	....	51·0
10	33·2	31·2	....	....	37·0
11	33·5	31·4	47·8	....	37·0
12	33·5	31·4	....	....	42·0
13	33·5	31·4	38·5	....	37·0
14	33·0	31·5	38·7	....	39·0
15	33·0	31·7	....	....	37·0
16	30·0	31·7	....	....	39·0
17	33·0	31·7	40·7	....	36·2
18	33·0	31·7	40·8	....	38·3
19	33·3	31·8	48·2	....	49·5
20	33·7	31·9	46·5	....	54·5
21	34·0	31·9	49·7	....	49·0
22	35·0	31·9	49·8	....	52·0
23	35·5	32·0	54·0	....	51·0
24	36·0	32·0	....	....	62·0
25	36·2	32·0	62·3	....	58·0
26	36·7	32·2	....	....	43·0
27	36·9	32·3	50·5	....	47·0
28	36·9	32·3	....	....	50·0
29	36·9	32·6	....	....	44·0
30	....	....	....	....	....
31	36·2	32·8	....	....	44·0
June 1	36·4	33·0	....	....	52·5
2	36·7	33·0	Leaves.	....	62·0
3	37·5	33·2	60·0	....	62·0
4	38·6	33·8	58·2	....	66·0
5	39·7	33·9	54·0	....	57·0
6	40·0	34·2	50·5	....	50·5
7	40·0	34·9	....	....	57·0

The earliest plants to flower were the following :—

1858. April 13.—*Alnus Americana, Anemone patens.*
May 3.—*Phlox Hoodii, Populus tremuloides.*
May 5.—Two *Salices, Populus balsamifera.*

May 6.—Two other *Salices*, *Shepherdia argentea* and *Hippophaë*, *Lathyrus* ?, *Equisetum*, *Tussilago*, *Negundo Fraxinus*, &c.

May 7.—*Viola* (two species), *Potentilla*, *Ranunculus*, *Androsace*, *Astragalus*.

May 8.—*Fragaria Canadensis*, two *Carices*, and *Poa*.

May 10.—*Salix*, *Lithospermum*, *Astragalus*.

Maximum and Minimum of every Twenty-four Hours (I began by the minimum) :—

Date.	Min.	Max.	Date.	Min.	Max.	Date.	Min.	Max.
1858.	°	°	1858.	°	°	1858.	°	°
Feb. 1	−21·5	24·0	Mar. 15	31·0	39·0	Apr. 27	35·2	75·0
2	−30·4	− 9·0	16	31·3	35·8	28	25·0	54·0
3	−25·2	0·0	17	25·8	31·5	29	27·2	64·5
4	9·7	32·0	18	15·5	33·0	30	31·0	65·0
5	14·0	32·2	19	12·0	41·2	May 1	42·2	69·0
6	− 9·1	12·7	20	14·4	33·6	2	45·0	75·5
7	−23·0	− 6·8	21	4·1	27·5	3	37·2	71·0
8	−24·7	3·0	22	23·7	40·0	4	40·1	73·2
9	−28·3	−10·0	23	31·0	40·0	5	30·0	52·7
10	−33·3	− 4·7	24	25·5	41·5	6	33·5	60·0
11	−27·0	− 7·8	25	21·6	39·8	7	38·8	61·7
12	−36·0	−19·7	26	22·5	35·4	8	31·0	63·3
13	−37·0	−24·0	27	21·0	41·2	9	33·0	60·8
14	−42·1	−23·6	28	15·8	49·5	10	33·0	59·8
15	−54·0	−24·2	29	32·4	45·0	11	14·5	43·8
16	−32·3	− 9·7	30	30·2	43·8	12	24·2	45·5
17	−13·2	− 1·6	31	29·0	45·9	13	20·0	32·0
18	−21·5	+ 1·2	Apr. 1	25·6	49·0	14	13·8	42·0
19	−24·4	3·8	2	25·3	34·6	15	27·0	58·7
20	−26·0	2·0	3	18·0	26·9	16	26·5	44·5
21	−31·0	8·0	4	16·0	37·0	17	28·6	48·0
22	−15·0	14·0	5	13·0	32·7	18	19·0	49·0
23	+ 3·6	39·2	6	22·0	47·0	19	30·5	61·3
24	7·2	32·8	7	22·0	48·8	20	41·2	70·3
25	18·4	44·6	8	22·0	37·2	21	34·0	72·2
26	19·0	39·0	9	18·6	48·7	22	39·0	67·2
27	− 5·0	18·8	11	26·7	53·7	23	40·0	68·4
28	−16·5	10·0	12	27·0	67·8	24	50?·3	70·0
Mar. 1	−18·0	2·4	13	24·5	50·0	25	35·3	69·0
2	−23·2	1·0	14	14·7	28·4	26	38·0	49·4
3	+ 3·3	17·2	15	9·0	48·0	27	45·0	54·7
4	8·0	20·7	16	9·0	48·0	28	38·9	54·0
5	3·0	24·0	17	19·8	42·0	29	33·7	48·8
6	15·5	39·1	18	34·2	61·0	30	31·9	51·0
7	12·6	35·8	19	29·0	63·0	31	27·6	56·2
8	23·7	38·8	20	23·6	52·5	June 2	44·0	72·0
9	22·9	46·7	21	18·0	48·3	3	49·5	70·0
10	13·7	30·5	22	20·0	44·2	4	46·8	77·8
11	15·6	37·7	23	20·2	45·5	5	44·0	63·3
12	21·2	39·2	24	26·5	55·0	6	31·9	56·0
13	11·7	43·8	25	28·0	52·7			
14	12·0	44·0	26	36·1	70·0			

Various Observations on Temperature made at Carlton in 1858.

		Feet.		Atmosphere.
			°	°
May 16	Water of the river at 9 A.M.	...	40·7	33·0
	Glacier in a bog surrounded with poplar-trees:			
	Under the ice towards the bushes of *Salix* ...	...	33·0	
	Open side between the ice and the earth ...	...	34·8	
	Under the ice at the foot of the *Salix*	...	34·7	
	Source of the bog	...	37·6	
	The bush of *Salix* had several catkins in flower.—The observations were made at noon.			
17	Another bog situated beside the *Populus* on which I made my observations:			
	Water of the bog at 10 A.M.	...	45·0	45·7
18	Water of the river	..	41·3	35·8
June 6	Poplar-bush, the leaves of which are twelve days later, at a depth of	3	41·0	
	Towards the roots, at 2 inches in the earth...	...	50·0	51·5

Measurement of some of the largest Trees observed in the Neighbourhood of Carlton.

Circumference in French mètres.

	Mètres.	Centimètres.
Populus balsamifera	2	53
Populus tremuloides..............................	1	15
Abies alba	2	25

Observed by Lieut. Blakiston, at Mosquito Point, on the Lower Saskatchewan, lat. 53° 50', long. 102° 53':—Abies alba? 2 mètres, 58 centimètres. The largest remarked, after quitting Hudson's Bay, near the great rapid of the Saskatchewan, 1 m. 60 cent.

Observed by myself in the Valley of Arches in the Rocky Mountains:—Abies nigra? 3 m. 69 cent. nearly; height about 160 feet. Most of the forest-trees had nothing remarkable in their size, the too frequent burning of the forests forming an impediment to the development of their beauty.

A few Observations on the Temperature of the Earth in the Prairies of the Saskatchewan.

		Depth.		Atmosphere.
1858.			°	°
Aug. 23	At the base of the Rocky Mountains... ...	3	42·5	58·0
24	At 9 A.M.	id.	42·0	55·0
27	On the Prairies of the Saskatchewan... ...	...	42·5	59·0
30	" " "	...	44·0	60·0
Sept. 2	" " "	...	47·0	38·5
7	" " "	...	45·0	40·5
9	" " "	...	46·0	39·0
10	" " "	...	46·0	40·0
14	" " "	...	45·2	47·5

Temperature of the Earth and Atmosphere at Edmonton at 9 A.M.

1858.	2 feet.	Atmosphere.		2 feet.	Atmosphere.
Nov. 9	37·5	44·0	Dec. 8	28·5	+10·0
10	37·5	34·0	10	26·0	− 7·5
11	37·5	31·5	12	23·0	−16·0
14	36·8	32·0	13	21·5	−10·5
18	35·5	20·0	18	21·0	−10·5
21	35·0	19·0	20	18·5	− 9·0
24	34·5	17·0	24	17·0	−18·0
27	33·7	25·0	28	16·5	−15·2
30	33·0	0·0	30	15·7	+ 1·7
Dec. 2	32·0	−14·0	1859.		
4	31·8	− 1·0	Jan. 2	13·5	− 1·7
6	30·0	−23·5			

Letter from J. W. SULLIVAN, Esq., on the subject of the accompanying Observations. Addressed to J. D. HOOKER, Esq., M.D., F.R.S., F.L.S.

Fort Edmonton, Saskatchewan,
January 10th, 1859.

SIR,—I have taken the liberty of forwarding the accompanying sheet of Thermometrical Observations on the soil, which I made on the route of the expedition during the last season.

As M. Bourgeau's time was wholly taken up in collecting and drying his botanical specimens, I undertook the observations when opportunity permitted, and carried them on according to the directions you gave him.

I would have willingly made a more extensive series, but the plan of our travels in the Rocky Mountains, when the party was broken up and dispersed in different directions, put a stop to the work. However, I will endeavour during the ensuing season to obtain as large a number as possible. They will no doubt be of some value, especially if we are to extend our explorations to the shores of the Pacific Ocean.

I have the honour to be, sir,

Your obedient servant,

J. W. SULLIVAN,

Secretary to the Expedition.

Observations on the Temperature of the Soil, taken during the above Journey, by J. W. Sullivan, Esq., Secretary to the Expedition.

Lat.	Long.	Date.	Ther. in Air.	Ther. in Soil.	Nature of Soil.	Remarks.
° ′ 52 32 N.	° ′ 109 6 W.	1858. July 3	° ..	° 44·9	2½ ft. V.M.—F.S.	Superior soil to any in the neighbourhood.
52 35	109 22	4	..	54·2	1½ ft. V.M.—F.S.	Near poplar clump.
52 35	109 40	6	50·	49·9	S.	On a sand-hill near to a growth of small poplars.
52 36	110 23	7	56·	53·9	S.	
52 36	110 50	8	65·	50·2	S.	Valley of Battle Riv.
52 33	111 20	9	58·7	49·1	½ ft. V.M.—S.	Near poplar patches.
52 28	111 30	10	66·6	54·2	.. ..	Valley of Battle Riv.
52 28	111 30	11	62·0	54·5	.. ..	do.
52 27	112 0	13	..	53·9	1 ft. V.M.—S.	Fine pasture here.
52 24	112 19	15	55·5	51·9	do.	Poplars and fine pasture.
52 24	112 19	16	65·0	52·2	do.	Same place.
52 24	112 19	17	70·0	52·2	do.	do.
52 23	112 40	18	..	52·1	do.	Fair growth of poplars.
52 23	112 40	19	65·	51·9	do.	
52 19	113 3	20	84·	53·4	S.	Dead Man's Creek.
52 19	113 3	21	57·	53·4	.. ..	do.
52 18	113 10	22	58·	52·0	3 ft. V.M.	Valley Red Deer R.
52 13	113 40	23	47·	52·5	do.	Nick Hills.
51 56	114 10	24	50·5	50·5	2 ft. V.M.—S.	Edge of the woods.
51 56	114 10	25	65·7	49·0	do.	do.
51 56	114 10	26	72·	50·0	do.	do.
51 56	114 10	27	69·5	50·1	do.	do.
51 56	114 10	28	65·	49·5	do.	do.
51 56	114 10	29	57·	49·5	do.	do.
51 36	114 0	30	63·	51·9	½ ft. V.M.—S.	In a creek valley.
51 26	114 0	31	46·	54·4	S.	do.
51 20	113 55	Aug. 1	75·2	54·9	S.	Prairie.
51 20	113 55	3	76·	55·1	S.	do.
51 9	115 6	9	60·	47·2	Shingle.	Bow River.

V.M. signifies Vegetable Mould
—F.S. „ followed by Fine Sand.
S. „ Sand.

Second Letter from M. E. Bourgeau, Botanist to Capt. Palliser's American Exploring Expedition. Addressed to Sir W. J. Hooker, F.R.S., F.L.S., and communicated by him.

[Read May 5th, 1859.]

Fort Edmonton, Saskatchewan,
October 9th, 1858.

Sir,—I have much pleasure in laying before you the results of my botanical labours during this second season.

I suppose that you have received my account of the preceding season, in which I gave you full details up to Fort Carlton. I shall now, therefore, confine my narrative to the period between that locality and the Rocky Mountains.

The expedition started on the 15th of June, crossing the prairie Saskatchewan between the two arms of the river of the same name. Some days afterwards I found several places rich in leguminous plants, and particularly some *Astragali*, which I had not found in the previous year. The numerous plants which I gathered led me to hope that I might find some fine things farther on. My only difficulty was from the rains, which fall annually in June and July. I recorded thirty-three days of more or less continuous rain. I have succeeded in preserving all my collections, without losing a single packet. I have not found as many different species as I had hoped to do. I have preserved many species already gathered the first season, on account of their forms, the dates, or their geographical distribution: probably half the collection is in duplicate.

On the 26th June we travelled over the open and treeless prairie, and on the 27th we encamped by a small forest of the two species of *Populus* (lat. 52° 39′ N., and long. 108° 52′ W.). On the 2nd July we reached more abundant forests, composed of the same trees, with thickets of rather large *Salix*, which provided us with excellent firewood.

The spaces between the forests consist of more or less marshy prairies, with large plants of different species, nearly all inhabitants of the forests, such as *Lathyrus*, *Vicia*, *Orobus* ?, *Astragalus*, and *Carex*, in abundance.

The prairies are rich in food for animals, the grass averaging in height from 18 inches to 2 feet (lat. 52° N., long. 109° 3′ W.).

From the 3rd to the 7th July we crossed a wooded sandy slope. In many places the vegetation appeared to have suffered from the frosts and the hail. All the poplars looked as if they

had been trimmed. The ends of the branches are cut by the frost nearly every year, and the number of checks which they thus receive gives them a peculiar appearance. Near this place we crossed two wide spaces, where the hail had destroyed all the vegetation except the trees and the *Salix*.

It is worth describing to you the inconvenience of some seasons; for instance, the frosts which occurred this year, on the 15th of May and the last week of July, destroyed all the seeds of the trees; and the catkins of the *Populus* and *Salix* fell to the ground without ripening. The same thing occurred with the coniferous trees; and thus I have been unable this year to procure the seeds of any trees.

On the 10th of July we encamped on the shores of the river Battle, between the woods and rich prairies. The soil appears very fertile here; and I remarked some specimens of *Abies alba* and of *Pinus Banksiana* which had escaped the fire—the first observed since leaving Carlton. This river is insignificant in summer. Towards the boundary of the woods it is in some places sunk between high banks. Lat. 52° 28′ N., long. 111° 17′ W. from Greenwich.

From the 18th to the 20th of July we encamped on the prairies and amid thickets near the Lake de Bœuf, which contains an abundance of a rather large fish of excellent quality. At this place we were about fifty miles from the superb river De la Biche, which is of sufficient size for the navigation of the ordinary boats of the country. Its shores are wooded for about 100 miles, particularly with *Abies alba* and the two species of *Populus*, useful as timber. Vegetation also is vigorous, and the soil appears to be very fertile. The varieties of herbaceous plants are not very numerous, but the quality of the species forms a good forage for horses. Fires appear to have been less frequent in this latitude —52° 1′ N.

On the 24th, 25th, and 26th July, we were in sight of the magnificent chain of the Rocky Mountains. I here observed a change in the vegetation. The first plants which attracted my attention were the *Geum rivale*, *Polygonum viviparum*, two species of *Geranium*, &c. Although still 100 miles from the mountains, I am each day in hopes of finding new plants.

Near a large "coulée" named the "Coulée of Coloured Stones," the prairie is magnificent; the *Astragali* especially forming a great ornament to it. There are large patches of different colours, particularly red; a yellow and a white *Astragalus*; a red, a white,

and a violet *Geranium*; a *Hedysarum*; the three varieties of *Rhinanthus*, &c.,—forming an *ensemble* most attractive to a botanist.

At last, on the 7th of August, we arrived at the foot of the Rocky Mountains, at the place where stood the ancient fort, in lat. 51° 9′ N., long. 115° 4′ W.,—the shores of the River des Arcs being 4100 feet above the level of the sea. In ascending this river, it is found to flow from a large valley in the interior of the mountains, which I have named the Valley des Arcs, as far as the second lake, there being a first and a second Lake des Arcs. The high peaks of this valley bear the following names: Pic des Pigeons, Pic de la Grotte, Pic du Vent—the last being so named from the storms which begin upon its summit. I have explored this valley more than any, and especially the mountains on the northern side of the Pic du Vent, which I have found peculiarly rich in alpine plants. From the river to the limit of the snow, all the chain of peaks, as far as the eye can reach, are wooded, principally with three species of conifers, *Abies nigra*? and *alba*, and *Pinus*. The latter grows mostly on the southern slopes, and does not much exceed thirty feet high—the largest being about one mètre in circumference. The *Abies nigra*? is the largest and tallest of the forest-trees which I have observed in the Valley des Arcs; one which I measured was 3 mètres 23 centimètres in circumference. There are also other forest-trees in greater or less abundance, as *Populus balsamiflua*, *P. tremuloides*, *Betula papyracea*, and *B. pumila*. The shrubs are mostly the same as in the plains, except some *Salices* of the alpine region.

There are considerable obstacles to travelling in the mountains. The forests suffer almost every year from fires; the trees fall in all directions on the ground, and thus form innumerable barricades to the progress of horses, and even of men. To ascend to the summit of a mountain, a very hard day's work is needed to cross the forest region. This description holds good of all the localities which I have visited.

I am happy to inform you that I have made a good collection during this season. I hope that I have gathered the greater number of the plants inhabiting that portion of the mountains which I have visited, and which I have been able to explore in seventeen days. For weighty reasons it was not possible for me to remain there longer.

The month of August is the best period of the year, the plants being in perfect flower, and some few in fruit. I observed but few withered kinds.

List of some species gathered close to the perpetual snow :—

Silene acaulis.	Draba.
Silene ——?	Androsace.
Arnica.	Vaccinium.
Menziesia?	Salix herbacea.
Pedicularis.	Poa alpina.
Gnaphalium.	Aspidium.
Erigeron.	Valeriana.
Artemisia.	Aquilegia.
Saussurea.	Dryas octopetala.
Luzula.	Epilobium.
Saxifraga.	&c. &c.

The nearest tree to the snow is *Abies alba*, which assumes the appearance of *Juniperus communis*, with which it grows; that is to say, it trails along the ground. The alpine region is from 6500 to 8600 feet in elevation.

The vegetation is not rich in species; the mountains are barren, with few streams and little humidity, and no pastures like those of the Alps. In the Rocky Mountains, streams are scarce on the southern slopes; on the northern, water is more abundant, owing to the snow; but they are only little torrents sunk deep in the rocks. This is the character of all the ravines which I have visited. The plants in the forests are for the most part common in the woods of the Saskatchewan plains. The number of species is about in the same proportion on the mountains as in the other parts of the country. They are few in number; but each species is abundant; and each mountain at the same elevation bears the same species, both on the north and on the south. All the collections made this season, and which are tolerably extensive and in a good state of preservation, are here at the Fort. Thanks to Captain Palliser, who has taken much interest in the success of my labours, and who has greatly assisted me in preserving the specimens from damp during the journey, I have about twenty-two packets of dried plants, and 110 of different sorts of seeds. The herbarium contains about 460 species, and about 60,000 specimens. I am now busy with the arrangement and packing of the collections, to be ready against the spring, the period fixed for my return to Europe.

I am, sir, &c. &c.,

E. Bourgeau.

Letter from Mr. CHARLES BARTER, Natural History Collector to the Niger Expedition, addressed to Sir W. J. HOOKER, F.R.S., F.L.S., and communicated by him.

[Read March 3rd, 1859.]

Steamer Rainbow, at Sea,
Fernando Po to Bonny,
January 2nd, 1859.

SIR,—In a brief note by last mail I noticed the sending of some cases containing the greater part of my dry collections; by this I send five cases more, and one small cask: this will comprise all that I have collected, or is fit to send home at present. The contents of these cases I will not refer to here; I have given Dr. Baikie a list of all, which he will send to you. The only living plants that I have considered it prudent to send at this season are about 40 species of Orchids, a Cycad, and some bulbous plants; these, in a close box, with dry shavings, will, I trust, be out of the reach of frost. The remaining living plants require to be sent in glazed cases. I have divided these as nearly as possible, and filled three cases, with directions for them to be sent home in April; these will reach home about the 6th of May—perhaps rather too early, but I cannot depend on any one looking after them here. Duplicates of each species (about 80 in all) I have planted out in a small piece of fenced-off ground at the Consulate at Fernando Po; if this is kept clear of weeds, the plants will not suffer much for a year, when I hope to return and replace with them any of those failing which I send now. Some ferns and moist-growing plants I have placed about dripping rocks in a ravine east of the Cove at Clarence.

Nearly all my dried specimens, I regret to say, have suffered much from damp since lying at Fernando Po: this is especially the case with dried fruits; and many fine specimens, brought from so far, I was obliged to throw away; a fine collection of cereals was in this way entirely destroyed. Much of this would have been saved, if, when we had come, everything had been removed up to the town on higher ground, instead of putting all into an old palm-oil shed on the beach; but our men were sick, and help from the shore could scarcely be obtained. All goes on well that can be done with one's own hand; but nothing can be got out of the liberated African.

Some of the plants in the cases are interesting. I notice espe-

cially the two kinds of Cola nuts, the produce of two distinct trees, one with four cotyledons, called "*Fatak*" by the Foulahs, the other with two cotyledons, called "*Gonja*" by the same people; the latter I have seen no living trees of; but it is said to come from the Ashantee country. The nut from which the present plant was raised I procured from a caravan at Rabba, on their return from the coast. The species with four cotyledons is the tree I mentioned formerly as existing at Fernando Po; I find it common in many parts of the lower Niger, abundant at Onitsha; it occurs also at Prince's Island, and is apparently a common tree along the coast. The flowers, like other *Sterculiaceæ* here, are variable in colour — cream-coloured, greenish-yellow, and pale-red. Both these species appear to be carried in about equal quantities into the interior; but the nut with two cotyledons is the most prized. "Gonja" in the Nupe country is worth about 100 cowries each nut, while "Fatak" averages about 80 only. The value of cowries at Rabba is 2500 for the dollar at 4*s*. 4*d*. Immense quantities of Cola nuts pass during the dry season from the coast to the interior. Caravans pass Rabba on the Kworra about half the year; of them about 1000 donkeys monthly are laden with Cola nuts: these are carried pannier-fashion—a basket on each side, each basket weighing on an average 50 lbs. Other caravan routes exist into this part of Africa; the principal one crosses the Kworra above Busa, direct for the Hausa country. Cola nuts are not much carried in the pod—this method is too cumbersome; but as it is necessary to keep them moist, and protected from the dry winds, the baskets are well protected with the leaves of a species of *Phrynium*, which keeps moist, and does not readily decay. Steamers running up this river might take some tons of Colas from the lower Niger, and dispose of them with advantage at Rabba.

The plant in case, called "*Bitter Cola*," is very different from ordinary Cola. I purchased dry nuts a long time since in the markets of the Borgu and Nupe countries, but could then ascertain nothing more than its coast origin. The seeds are much valued by the people for their medicinal properties, and command a higher price than Cola; the nuts are intensely bitter, but not astringent as common Cola. This tree I have not seen, but it grows at Onitsha and at Fernando Po; the fruit is about the size of a small peach, rose-coloured, and very pretty. The large *Artocarpean* noticed by Vogel in 1845 (the "Oqua" of the Eboe), I send many plants of, and have some 200 others planted out at Fernando Po. Its enormous fruit is very curious, but, I fear, as a fruit of little

value beyond its edible seeds; it is however a fine ornamental tree for planting in any of our tropical colonies. *Bassia Parkii* has puzzled me much: first I could not induce them to vegetate for months; now they continue dying off; but I trust some will reach home alive. The young plants of the "Opakala" will prove valuable, both as an economical plant, and as a fine tree. I have enclosed some of its large ligneous pods and edible seeds in one of the boxes. It grows in the lower Niger, Fernando Po, and Prince's Island; the negroes collect the seeds, boil them slightly, slice and dry them for future use. Some plants of the *yellow dye* (of Soudan) in the case are very small; but it has large roots, and a tendency to be herbaceous, so perhaps will not be dead, if invisible, when the case is opened.

We visited Prince's Island to purchase stock, and recruit the health of our sick people by a sea breeze. This island, unlike Fernando Po, has no very elevated land; it presents from the sea a number of peaks, an immense block of rocks (some conical, others flat-topped), with butting cliffs or perpendicular walls of sheer precipices more than 1000 feet high, these bare of any vegetation, white and dazzling in the tropical sun. We steamed into West Bay amidst torrents of rain, which, clearing up, showed a number of pretty cataracts descending in streams down the precipitous sides of the little mountains, in thin silver lines—when shooting the rock, spreading out as they came down in a horsetail manner, till, falling far down, they were lost in a cloud of mist and vapour below. The rocks are mostly soft, having been changed by igneous action. The soil is rich, composed principally of decomposed trap; beds of conglomerate and pebbles lie about the base of the hills.

This island is celebrated for producing good coffee. Chocolate is also much grown, or rather has been extensively planted; numerous ravines, dark and gloomy, abounding in moisture, are well adapted for its cultivation. Traces of sugar plantations exist; but its culture seems now abandoned. Indeed everything evinces decay, and no system of management; coffee trees appear here and there, as if dropped from the clouds, struggling for life among trees and shrubs by which they are surrounded. Cacaos, more vigorous in growth, maintain their existence better, and soon take entirely for themselves the moist places in which they have been planted; the fruit of this was ripe at the time, and seemed the favourite food of monkeys, which must be very destructive to the crop. Ginger, arrowroot, yams, and all the fruits of the coast are grown

here in abundance for the supply of ships. Many fruit-trees have become wild; this is especially the case with *Anona muricata*, *Persea gratissima*, and *Carica Papaya*. Plantain, banana, mango, lime, guava, form no inconsiderable portion of the "bush" in the lower grounds; the pine-apple too, established everywhere, will defy extirpation. A Portuguese lady, long resident here, has attempted cultivation on a large scale. Her houses are large, and built in a style of magnificence unlooked-for out here: about them are avenues and vistas lined with graceful cocoa-nut trees in the background; *Jatropha multifida*, *Poinciana pulcherrima*, and a species of *Fourcroya*, planted at regular intervals, form the margin, and have a very pretty effect. I was unsuccessful in reaching the higher grounds, in two attempts, owing to the excessive rains and the density of the forest. Under the tall trees during the rains it is so dark and gloomy, that plants can hardly be seen; I therefore gathered but few. Much of my collecting was done in a boat, landing here and there whenever a footing could be obtained. Dr. Baikie and I visited many of the small islets which lie just detached in these bays, generally with a thorough drenching. These are mere rocks rising 20 or 30 feet above the water; some of them were covered almost exclusively with *Oleandra nodosa*, fully exposed to the sun and sea-breeze. The plants were 3 or 4 feet high, quite shrub-like in character, beautifully in fructification, and covered with lichens. On the steep sides of the larger rocks grew an abundance of a very large Orchid, resembling a *Vanda* in habit, but, like too many of the African Orchidaceæ, with small, yellow, insignificant flowers. *Melastomaceæ*, as usual, were plentiful; one species, 12 or 16 feet high, with magnificent red flowers, would be a fine ornamental plant in our stoves at home. I have sent, in the cases, plants of another species, of small growth, rose-coloured flowers, and scorpioid inflorescence. Species of *Mussænda*, with their conspicuous white bracts, were common; also a shrub with spikes of purple flowers, like a *Veronica*: this had a singular pair of white leaves at the base of each spike, rendering it a very showy plant. Ferns were not wanting,—*Drymaria*, *Asplenium*, *Elaphoglossum*. *Polytrichum commune* I was much surprised to find occupying the moist hollows on the top of the rocks in dense tufts; with it, almost buried in the moss, grew *Trichomanes crispum*. In shady places a very pretty fern was growing, an *Asplenium* somewhat resembling *Darea cicutaria*, but of a still more elegant habit.

Whoever has an opportunity of visiting the quiet nooks in the

bays about these islands will be struck with the exquisite beauty of the waters and the various forms which can be seen beneath them. At 50 or 60 feet, the eye penetrates with ease: the bottom is rocky and very irregular; the boat at one moment glides over masses of coral-bound rock many feet below, but on which many beautiful sponges and corallines can be seen; the rest reveals nothing but a cavernous depth of blue water, unless a shoal of those beautiful fish of the tropics dart across. The rocks and everything that is exposed to the alternate action of the tides are covered with the small Mangrove Oyster; below it, seldom exposed, grows a pretty crimson Coral, with it a large *Flustra*. Gorgeous *Actiniæ*, with the common *Echinus* and Starfish of more northern climes, abound in all the little salt pools, on these rocks. The sponges are very large; but few are sufficiently soft to be fit for use. The waters are almost destitute of Algæ; I gathered but one species of *Fucaceæ*, and that not attached; a small plant of confervoid growth alone represents the family.

The vegetation of Prince's Island, from its proximity to Fernando Po, cannot, of course, be essentially different. At present I have seen so little of either island, that scarcely anything like a comparison can be ventured on. At Prince's Island I was at once struck with the abundance of *Begonias*; at Fernando Po only one species (and that with yellow flowers, and therefore a questionable *Begonia*) was seen. Some 10 or 12 species occur in Prince's Island: I gathered several; but being very juicy plants, I lost all but three in drying. I fancy three of those gathered to be identical with *B. nitida*, *B. ulmifolia*, and *B. Fischeri*. Most of the others were large-leaved succulent species, all having rose-coloured flowers; they grow on trees for the most part, a semiepiphytical life sustained in the black soil which collects on old trees of the forest. We found here an *Elæis*, which I fancy is distinct from *E. Guineensis*; the great size of some nuts which were brought alongside the ship for sale first drew my attention to it. These nuts were three times the size of *E. Guineensis*; the trees also present a different aspect, resembling more the cocoa-nut. The pinnæ in *E. Guineensis* stand out irregularly, some pendulous, others erect; in this variety they are somewhat pendulous, but all regular and on one plane, as in the Cocoa-nut: the tree is not abundant, but grows scattered along the shore. The Baobab, not seen at Fernando Po, grows pretty common at Prince's Island, also the "Opakala" (a large Artocarpean), or "Oqua" of the Eboe; the latter I secured in flower for the first time. Little marshy ground

occurs; yet about the estuaries of small streams, *Avicennia rhizophora* and *Pandanus candelabrum* occur. The woods evince almost perpetual moisture; climbing *Aroideæ*, with immense orchids and ferns, occur; scarcely any of the orchids are interesting. Their flowers are insignificant, comprising such genera as *Angræcum*, *Bolbophyllum*, *Polystachya*. Of ferns, the most common are *Platycerium Stemaria* (very large), *Drymaria coronans*, *D. vulgaris*, *D. viridis*, *Asplenium crenulatum*, *A.* like *lucidum*, *Mertensia gigantea*, *Lygodium scandens*, *Gymnogramma Calomelanos*, *Angiopteris evecta*, *Acrostichum aureum*, *Lastrea mollis*, *L. invisa*, *Tæniopteris*. *Lastrea*, *Asplenium*, *Adiantum Diplazium*, *Gymnopteris*, *Trichomanes*, are largely represented. An *Acrostichum* resembling *Stenochlæna scandens* is very abundant, adhering to the trunks of trees like ivy. *Lycopodiums* are abundant, *L. dendroideum* especially, in loamy soil. *L. Phlegmaria*, epiphytical on trees, hanging down often a yard in length, and very beautiful.

I obtained a sprinkling of mosses, chiefly of *Hypnum*, some Hepaticæ, and a few curious Fungi.

This is a meagre account of the botany of this island; and my collection indicates little; the heavy rain, however, prevented me doing better. Much of the low land has been cultivated; and many introduced plants are now wild. *Canna indica*, *Caladium bicolor*, very beautiful in moist places, and a few European weeds exist—*Poa annua*, and *Plantago major*. An umbelliferous plant is very abundant, and must be indigenous; I believe it to be an *Eryngium*. Some very good cabbages are grown both at Prince's Island and Fernando Po without going to elevated ground; water-cresses are abundant in some of the brooks, but of course have been introduced.

Our repairs complete, we left Fernando Po on the 2nd of January. The weather in this island for the last three weeks has been almost free from rain, the days hot, with the usual haze of the dry season, called "smokes" by the traders. December to March are the best months for botanizing in this island. *Clerodendron splendens* and some fine scarlet *Combretaceæ* are very handsome at this season; most of the large forest-trees are also just flowering.

The mountains are seldom visible. Sometimes at dawn the peak of Clarence appears, but is enveloped in clouds soon after the sun rises; and an occasional glimpse of the stupendous Cameroon, towering far up in the firmament, is also obtained. I never rise at such times without anticipating the pleasure I shall have

in ascending these untrodden alpine forests and the bare regions beyond, where the monotonous vegetation of the hot plains of the interior must give way, to be replaced by those forms only found at elevations, and an African mountain botany which cannot fail to yield much that is new to Botanical Science.

We reached the Bonny this evening (4th) and lie at anchor inside the bar. This river has a much better mouth than the others, and is safer; but some wrecks are visible from where we lie. We shall ascend by the Brass river on the 8th, under much better auspices than formerly. Some difficulty is apprehended through the shallow water; for I think the Niger has never been entered before at this season. If we get aground in the delta, it may be a temptation to the natives; but as long as we can keep a healthy crew, we have not much to fear from the people.

Writing is difficult at sea in so small a ship, but off the bars of these rivers impossible. I hope to date my next, in one month, from Rabba.

I remain, Sir, your obedient Servant,

CHARLES BARTER.

P.S.—Consul Hutchinson and Lady arrived safely at Fernando Po; some roses which they received at Kew, I found alive, have had them planted, and all are growing.

Dr. Baikie, myself, and every European on board are in excellent health.

Second Letter from MR. CHARLES BARTER to SIR W. J. HOOKER, F.R.S., F.L.S., &c., communicated by him.

[Read June 2nd, 1859.]

Steamer Rainbow,
Lagos, March 7th, 1859.

SIR,—By this mail I forward a bundle of dried plants, containing about 110 species, some specimens of woods*, the fruiting panicle of a *Calamus*, fruits preserved moist, and a few seeds. Some of the dried plants were collected on Lagos Island, but the greater part at "Eppah†," a town on the Crado Lake, about thirty miles east of Lagos.

We have spent more time here than could have been wished,

* The collections arrived safely, April 1859. Though a comparatively small collection, they are extremely interesting.—W. J. H.

† Dr. Baikie says, this should be spelt "Ekpe."

through the district about Lagos being disturbed by the ex-king Kosoko, and news that the Dahomeans were about to attack Abeocuta. This induced Dr. Baikie to visit Kosoko at his town of Eppah, distant about thirty miles from Lagos, on the Crado Lake. H.M.S. Brune, with Consul Campbell on board, went with us. This chief (Kosoko) received us with much courtesy, and expressed himself desirous of remaining on good terms with the English. His previous acts do not warrant the truth of these professions; but for the present no impediment exists to our moving inland. Dr. Baikie and myself will therefore leave about the 12th; Lieut. Glover and Dalton will come up afterwards.

The margin of the Crado Lake is nearly everywhere swampy, with but few tall trees, and scarcely any oil-palms; it may be said to be bounded with *Raphia vinifera*, which luxuriates in the fetid black mud, now (in the dry season) covered with fallen leaves, through which the foot sinks, at every step, above the ancle. Behind this the land rises; and about Eppah some rocks occur of soft iron conglomerate, with a rich loamy soil.

Lofty forest trees are first met with here, amongst which some tall *Clusiaceæ* are conspicuous; one with crimson flowers I recognize as being abundant in the lower Niger. It is a slender tree, 70 or 80 feet high, with branches only at the top, spreading out regular and drooping, so that in flower it resembles a gigantic crimson umbrella. All parts of this tree yield an abundance of yellow juice, resembling Gamboge when coagulated; some has been collected and sent to R. Bentley, Esq., to ascertain if it has any commercial value. Another large tree of this order I send dried fruits of, and some nuts; the latter are very oily, and a kind of butter is prepared from them: I suspect this to be *Pentadesma butyracea*, but do not know the plant.

A Rubiaceous tree (common on the Niger) grows about this lake. I cut down a tree, and obtained flowers, which grow in heads like *Sarcocephalus*; perhaps it is some *Nauclea*; the leaves are of great size in the young plant, with large foliaceous stipules. "Agidde," or country bread, is generally wrapped in the flexible leaves of this plant when it is exposed for sale in the markets. A noble *Composita* was seen here in open places; it sends up a slender stem from 10 to 20 feet high, unbranched, with large pubescent leaves on the top; its flowers, which are not ornamental, are produced when the plant has reached its height, after which it dies.

I send a large fruiting panicle of a species of *Calamus* (perhaps *C. secundiflorus*, for it is one of the commonest on the coast),

and imperfect specimens of a new species which has almost entire leaves, and a stem without spines. Many species of these climbing palms exist in the hot jungles which abound on the coast, but they nearly all grow to a great height, firmly attached by their hooked spines to lofty trees. Flowers or fruit in such situations it is almost impossible to obtain, unless many trees are felled for the purpose.

About the town of Eppah I gathered some fine crimson-fruited *Sterculiaceæ*. An *Apocynea* with white fragrant flowers, *Acanthaceæ*, *Rubiaceæ*, and a few shrubby *Euphorbiaceæ* occupy the cleared places. *Phrynium Danielli* is very common in the deep woods; its singular-tasted fruit is now in the greatest profusion.

Orchids were very scarce; but on some old trees grew large masses of the *Rhipsalis*, which I sent from Prince's Island.

The large Rubiaceous fruit (enclosed) is employed by the people in marking their faces and other parts of the person with permanent black lines. I believe an incision of the skin is necessary to effect this properly. It is used chiefly by those people who pride themselves on a skin a few shades lighter than the ordinary negro of the coast; the latter is too black for such an embellishment to be visible.

No. 3298 of 'Herbarium,' is a beautiful Anonaceous shrub growing at Eppah: the flowers (now turned black in drying) are very handsome; the long outer petals are spotted red, brown, and yellow, quite white at the base; the inner ones, almost hooded, have a singular appendage midway on the margin, which I first mistook for stamens, till a closer examination showed it to be Anonaceous. No fruit or seeds could be obtained; but, as I shall probably meet with it again in the Yoruba forests, I hope to see it yet in our stoves at home.

Aquatic plants can hardly be said to be numerous in Western Africa; the following species occur in the Crado Lake:—*Papyrus antiquorum*, 10 or 12 feet high, is very abundant about Palaver Island when the water is brackish, with *Typha angustifolia*, *Vallisneria spiralis*, *Pistia stratiotes*, *Jussiæa villosa*, *Azolla Nilotica*, *Nymphæa* dentata*, *Ceratophyllum vulgare*, *Utricularia stellata*, *Ceratopteris thalictroides*, *Salvinia* sp., *Lemna* sp., and a species of *Hydrophyllaceæ* with small blue flowers; these plants occur in small bays or creeks where the water is undisturbed by the swell raised by the sea breezes. The bed of this lake is hard white clay; average depth of water 10 or 12 feet.

Before our interview with "Kosoko," I could only get on shore

quietly in a few places, penetrating twice about 3 miles inland. On this, the N.E. side of the lake, beyond the belt of swamp bordering it, the soil is fine rich loam, well-watered, and capable of growing any tropical produce. Some cleared ground occurs here and there; but very little of it is now under cultivation; for the growth of cotton it is well adapted. If the attention of the present occupiers could be turned to this article, several hundred square miles contiguous to water might produce cotton, which could be carried to Lagos by canoes merely across the lake. A considerable quantity of cotton is now coming down from Abeokuta (distant 70 miles from Lagos by river); the price paid there for cotton in the seed is one halfpenny per lb., three of which yield one pound pure when cleaned. Labour of cleaning, transit to Lagos, with shipment, raise it to 3*d.* per lb.; one penny more, freight to Liverpool, leaves still a profit; but a much larger supply is necessary before the leading merchants here will enter into the trade with the same advantage that now attends their dealings in palm oil.

Too much must not be expected of Central Africa as a cotton-producing country; the plant needs more moisture than it would obtain in much of the land in the interior, and water-carriage should never be far distant in a country where all loads are conveyed by canoe or on the heads of men and women. There is plenty of available land near the sea and by rivers; the great valley of the Niger would alone yield an enormous supply: it is here cotton must be looked for, and its growth encouraged; the great plains of the interior are almost as useless in this respect as Sahara itself.

I remain, Sir, your most obedient Servant,

CHARLES BARTER.

Note on the species of *Croton* described by Linnæus under the names of *Clutia Eluteria* and *Clutia Cascarilla*. By JOHN J. BENNETT, Esq., F.R.S., Sec. L.S.

[Read April 21st, 1859.]

DURING a late residence in the Bahama Islands, the attention of our indefatigable member, Dr. W. F. Daniell, was especially directed to the species of *Croton* growing in those islands; and I am enabled, by his kind communication of the specimens collected by him, to

clear up much of the obscurity in which the species furnishing the Cascarilla-barks of commerce have been involved. I willingly leave in his own able hands that portion of the subject which relates to the Materia Medica and the commercial history of the Barks in question, and shall limit myself, in the present brief notice, to the botanical history and discrimination of the species which have been confounded together under the specific names of *Eluteria* and *Cascarilla*.

The first account given by Linnæus of *C. Eluteria* occurs in 'Hortus Cliffortianus' (1737), pp. 486–7. Of the plant there carefully described, an authentic specimen exists in Cliffort's Herbarium in the British Museum, with a portion of the description attached in Linnæus's own hand, and marked with the only synonym quoted:—"*Cortex Ilatheria*. Elutheria Provid. folio cordato subtus argenteo. Sweet bark, s. cortex bene olens. Petiv. Collect. p. 4 n. 276." The synonym; the habitat, "crescit in Insula Providentia;" and the name *Elutheria*, derived from the adjacent island of Eleuthera, all bespeak its Bahamian origin. Of this very distinct species, a specimen brought from the Bahamas forms part of Catesby's collections in the British Museum; and there also exist, in the Banksian Herbarium, a similar specimen of Catesby's from Gronovius, together with specimens from the Herbarium of Philip Miller, from the "Bahama Islands, Long Island," collected by Peter Dean, Esq., in 1788; and from the "southern parts of North America," collected by André Michaux, the latter sent under the erroneous name of *Croton Cascarilla*. Linnæus himself never possessed a specimen; and having, apparently, entirely forgotten its characters, he referred to it in his 'Flora Zeylanica' (1748), No. 366 (with several other equally erroneous synonyms), the *Mahapatigaha* of Hermann's 'Museum Zeylanicum,' of which no specimen existed in Hermann's collections, and added the officinal synonym of *Cascarilla*. Of the additional synonyms, that quoted from Breynius, Plukenet, and Seba, unquestionably belongs to the plant subsequently named by Jacquin *Croton niveum*; and that of Plumier and Catesby, as we shall hereafter see, is the foundation of Linnæus's own *Clutia Cascarilla*. In his 'Materia Medica,' published in the following year, he ascribes the Cascarilla Bark to the *Eluteria* of his 'Flora Zeylanica,' with the single synonym of Catesby; while in the first edition of 'Species Plantarum,' published in 1753, he quotes, under *Clutia Eluteria*, his 'Flora Zeylanica' and 'Materia Medica,' *Eluteria* of 'Hortus Cliffortianus,' and the mistaken synonym of Plukenet and Seba. Of all

these, it is evident that the only true synonym is that of 'Hortus Cliffortianus,' from which the name of the species was derived.

Up to this time Linnæus had in his own herbarium no specimen referred to *Clutia Eluteria*; and there is no indication by which it can be positively determined whence and at what period the specimen which he subsequently designated by that name was obtained. It appears probable, however, that it was one of the Jamaica specimens received by him from Patrick Browne, and described in his 'Pugillus Plantarum Jamaicensium' (1759), inserted in the fifth volume of his 'Amœnitates Academicæ.' The description which he there gives (p. 411) of *Clutia Eluteria* is quite inapplicable to the original plant, and exactly agrees with this specimen. In the second edition of 'Species Plantarum,' he refers to this description, adds Patrick Browne's synonym, and retains that of 'Hortus Cliffortianus,' as well as the erroneous reference to Plukenet and Seba. It is only necessary to add, that in Swartz's 'Flora Indiæ Occidentalis' (p. 1183), Patrick Browne's plant is properly referred to the genus *Croton*, and is carefully described, under the name of *Croton Eluteria*, as synonymous with *Clutia Eluteria*, L., and that a figure of the true or Bahamian species, taken from one of Mr. Dean's specimens in the Banksian Herbarium, is given in Woodville's 'Medical Botany,' t. 223, together with a sketch of a miserable scrap of the Jamaica plant from a specimen communicated to the same Herbarium by Dr. Wright, who, in the eighth volume of the 'Medical Journal,' describes it as producing "the Cascarilla or Elutheria of the shops."

I now turn to the second species, *Clutia Cascarilla*, L. Linnæus had originally no knowledge of this species, except that which he derived from the figure of Catesby and the synonym of "*Ricinoides* elæagni folio," quoted by Catesby from Plumier; and both of these he referred, in his 'Flora Zeylanica,' to the confused heap there collected under the head of *Eluteria foliis cordato-lanceolatis*. The same confusion between the Bahamian and the Ceylonese species was continued in his 'Materia Medica'; but in the first edition of 'Species Plantarum' he distinguished the plant figured by Catesby under the name of *Clutia Cascarilla*,—mistaking, however, the habitat, which Catesby indicates as the Bahamas, and substituting Carolina in its stead. As he denotes by his usual symbol (†) that he had never seen this species, and quotes no other synonym than that of Catesby, there can be no question that the species is wholly founded on the figure and description of that

author, both of which are remarkably good representations of a plant of which Dr. Daniell has brought home excellent specimens, and which (as far as I am aware) has never before been forwarded to European herbaria. Catesby's description is as follows:—"The Ilathera Bark; *La Chachrille*. These shrubs grow plentifully on most of the Bahama Islands, seldom above ten feet high, and rarely so big as a man's leg, though it is probable that, before these islands were exhausted of so much of it, that it grew to a larger size: the leaves are long, narrow, and sharp-pointed, and of a very pale light-green colour; at the ends of the smaller branches grow spikes of small hexapetalous white flowers, with yellow apices, which are succeeded by tricapsular pale-green berries, of the size of peas, each berry containing three small black seeds, one in every capsule. The bark of this tree being burnt, yields a fine perfume; and, infused in either wine or water, gives a fine aromatic bitter."

As in the former case, it was not until after the publication of the species in the first edition of his 'Species Plantarum,' that Linnæus became possessed of a specimen totally different from the original plant, but which he nevertheless referred to it. The same concurrence of circumstances as in the former case leads me to believe that this also was received from Dr. Patrick Browne. It perfectly agrees with the description of *Clutia Cascarilla* given in the same Dissertation in the 'Amœnitates Academicæ,' vol. v. p. 411, with the synonym of Browne, and with the figure of Sloane's 'History of Jamaica,' there quoted, and is the "Wild Rosemary" of most of the West Indian Islands, subsequently described by Jacquin under the name of *Croton lineare*—a name, which has since been generally, but erroneously, considered as synonymous with the *Clutia Cascarilla* of Linnæus.

It only remains to formularize these details, with the addition of discriminative characters, premising that both the original species and those which have been substituted for them are true Crotons, in the comprehensive sense in which that genus is still maintained.

1. **Croton eluteria**, foliis petiolatis subcordato-lanceolatis obtuse acuminatis supra viridibus squamulis peltatis raris punctatis subtus dense argenteo-lepidotis lucidis, spicis simplicibus axillaribus terminalibusque monoicis.

Elutheria Providentiæ, folio cordato subtus argenteo. Sweet Bark, a cortex bene olens. *Petiv. coll.* 4, n. 276.

Elutheria, *L. Hort. Cliff.* p. 486!

Clutia Eluteria, *L. Sp. Plant.* ed. 1. p. 1042 (*excl. synon. omn. præter Hort. Cliff.*).

Clutia Eluteria s. Cascarilla, *Woodv. Med. Bot.* p. 633, t. 223. f. 2!

Hab. In Insulis Bahamensibus, *Catesby*! *Dean*! *Dr. W. F. Daniell*!

2. Croton cascarilla, foliis petiolatis anguste lanceolatis utrinque attenuatis acutis margine planis v. subundulatis supra viridibus glabris subtus pallidis pilis stellatis intricatis dense vestitis, spicis simplicibus terminalibus monoicis.

Ricinoides elæagni folio, *Plum. Spec.* 20; *Icon.* p. 236, t. 240. f. 1; *Catesby Carol.* vol. ii. t. 46.

Clutia Cascarilla, *L. Sp. Pl.* ed. 1. p. 1042.

Hab. In Insulis Bahamensibus, *Catesby*; "Providence," *Dr. W. F. Daniell*!

3. Croton lineare, foliis subsessilibus linearibus obtusis margine plus minus reflexis supra viridibus glabris subtus pallidis pilis stellatis intricatis densissime vestitis, spicis simplicibus axillaribus terminalibusque dioicis.

Ricino affinis odorifera fruticosa major, rosmarini folio, fructu tricocco albido, *Sloane, Hist. Jam.* i. p. 133, t. 86. f. 1!

Croton fruticulosum; foliis longis, angustis, subtus incanis margine reflexis, *Browne, Jam.* p. 347.

Clutia Cascarilla, *L. Amœn. Acad.* v. p. 411; *L. Herb.*!

Croton lineare, *Jacq. Amer.* p. 256, t. 162. f. 4; *Pict.* p. 124, t. 263. f. 80.

Croton Cascarilla, *Woodv. Med. Bot.* p. 629, t. 222.

Hab. In Ins. Jamaica, *Sloane*! *Houstoun*! *Wright*!; in Insulis Bahamensibus, *Catesby*! *Dr. W. F. Daniell*!

4. Croton Sloanei, foliis petiolatis ovatis obtusis v. obtuse acuminatis perforatis squamulis peltatis supra raris infra numerosis adspersis, spicis compositis axillaribus terminalibusque monoicis.

Mali folio arbor artemisiæ odore et flore, *Sloane, Jam.* ii. p. 30, t. 174. f. 2!

Clutia Eluteria, *L. Amœn. Acad.* v. p. 411; *L. Herb.*!

Croton Eluteria, *Swartz, Fl. Ind. Occid.* p. 1183; *Wright*, in *Med. Journ.* viii. p. 3! *Woodv. Med. Bot.* p. 634, t. 223. f. 1 (*pess.*)! *Hayne, Arzneygew.* xiv. t.

Hab. In Ins. Jamaica, *Sloane*! *Wright*!

These four species are so totally distinct, that, when once discriminated, they can never again be confounded. In addition to the three former, Dr. Daniell's collection from the Bahamas contains specimens of *Croton lucidum*, L., and *Croton balsamiferum*, Jacq.

Notes on *Homalium*. By GEORGE BENTHAM, ESQ., V.P.L.S.

[Read June 2nd, 1859.]

IN the revision of the 'Hong Kong Flora,' with which I have been lately occupied, I had occasion to investigate the validity of the genus *Blackwellia*, of which an elegant Chinese species was many years since introduced into our gardens, and has found its way into catalogues and botanical works under six different names. The result of this investigation has been the conviction that the genus must altogether be united with *Homalium*. I could not, however, come to this conclusion without a careful examination of all the species referred to both genera of which we had specimens; and as I also found several unpublished ones in the herbaria at Kew, I have been led to draw up a short synopsis of the whole group, which I now beg to lay before the Society.

The genus *Blackwellia* was originally established by Jussieu and Lamarck on two or three Mauritius trees which differed from the only two *Homalia* then known, both from South America, in having only one instead of three stamens opposite each petal (or inner segment of the perianth as it was then called). Ventenat afterwards added two or three eastern species having the same peculiarity; and De Candolle, in the 2nd vol. of the 'Prodromus,' maintained the two genera, with the same technical character as well as geographical distinction. Since then, several Asiatic species with two or more stamens to each petal have been described, and yet they have been published as *Blackwellias*. An exception, has been made in the case of the African *Homalium angustifolium*, which has the character of the American ones; and Sir James Smith, who always closely adhered to generic character, published it accordingly as a *Homalium*. Modern botanists, however, applying too literally the rule of "character non facit genus," appear in this instance to have practically adopted geographical origin as the sole basis of the limitation of the two genera. Some other characters are indeed indicated by Endlicher and others, such as the supposed larger calycine segments or capitate stigmas of the American ones; but none of them will bear the test of examination. And few, I believe, would now contest the generally admitted rule in systematic botany, that geographical origin without any character is not to be recognized as a generic distinction. It therefore becomes necessary to unite the Asiatic clustered-stamened species with the corresponding American *Homaliums*. As some of these, again, in other respects resemble the single-stamened species more than

they do each other, and as the whole series have a remarkable conformity in the general structure of their flower as well as in foliage and in habit, it appears more appropriate to consider them all as one genus, which can be artificially divided into two sections on the old character.

There is one point, however, in which the American species appear slightly to differ from the Asiatic and African ones: the fruit, at least in *H. densiflorum* and *H. pedicellatum*, becomes very hard, and in our specimens shows no disposition to open in valves, whilst it does so most readily in some of the Asiatic ones, splitting the styles so as to cause them to have been occasionally described as double their real number. But I have not seen the fruit quite ripe in any species: the ovary, shortly after flowering, appears to harden in the Asiatic *H. grandiflorum* as in the above-mentioned American ones; and in the original American *H. racemosum* and *H. Racoubea*, the fruit is said to open in short valves at the top, although I see no tendency to it in our specimens. This character cannot therefore be made available for generic distinction, being accompanied by no corresponding differences in habit or in other organs.

Among old genera not really differing from *Homalium*, *Racoubea* (Aubl.) has long been united with it, and *Astranthus* (Lour.) with *Blackwellia*; Miquel has also correctly joined with it the *Condylocarpus* lately established by Blume. On the other hand, *Napimoga* (Aubl.), which does not appear to have been examined since his time, can scarcely be a congener, not having the characteristic glands: the analyses given, rude as they are, are not to be depended on for correctness, and afford no evidence of the plant belonging even to the same natural order.

In the distinction of the species, besides the artificial sectional character above mentioned, the inflorescence, either a close panicle with short divaricate branches, or long racemes, either solitary or few, forming a long loose panicle, as indicated by De Candolle, divides well the *Blackwellias* into two groups; and the species are mostly well characterized by the relative size and shape of the calycine segments and petals taken especially when slightly enlarged after the flowering is over. In some of the section *Blackwellia* they are all nearly of a size, linear or oblong, slightly narrowed at the base, ciliate at the edges, so as to give the young fruit precisely the shape of elegant little shuttlecocks; in *H. senarium*, *H. pedicellatum*, and others, they are all broader at the base, spreading or reflexed and radiate round the base of the

hardened conical free part of the fruit; in others, again, all have a tendency to close over the young fruit. In *H. grandiflorum* and *parvifolium* the calycine segments are much enlarged, oblong, narrowed at the base, thin and spreading horizontally, whilst the shorter and broader tomentose petals close over the fruit: in the *H. bracteatum* the same arrangement apparently takes place; but it is the petals or inner row that are enlarged and spreading, whilst the calycine segments, or outer row, remain broad and short, and close over the fruit.

HOMALIUM, *Jacq.*

Homalium et Blackwellia, *Juss. Gen.* p. 343; *DC. Prod.* vol. ii. p. 54; *et Auct. recent.*—Cordylanthes, *Blume, Mus. Bot.* vol. ii. p. 27.

Calycis tubus turbinatus v. oblongus ovarii basi adnatus; limbus pluripartitus segmentis (4–12) petalisque totidem cum iis alternantibus persistentibus post anthesin sæpius accretis. Glandula pulvinata intus ad basin cujusve calycis segmenti. Stamina ad basin petalorum inserta iis opposita, tot quot petala, vel ad quodque petalum 2–7 approximata v. fasciculata. Ovarium uniloculare, basi adnatum et vacuum, superne liberum conicum, stylis 3–5 liberis v. basi connatis coronatum; placentæ parietales versus apicem cavitatis tot quot styli et cum iis alternantes; ovula in quaque placenta 2–6 (sæpius 4) pendula. Fructus paullo accretus, siccus, medio calycis segmentis petalisque persistentibus et sæpius accretis cinctus, apice valvulis stylos findentibus et medio placentiferis breviter dehiscens (v. induratus et indehiscens?). Semina pauca parva pendula oblonga. Albumen haud copiosum. Embryo rectus, radicula brevi supera, cotyledonibus oblongis tenuiter foliaceis.—Arbores fruticesve *regionum calidiorum utriusque orbis.* Stipulæ *parvæ, sæpius caducissimæ.* Folia *alterna integerrima v. sæpius obtuse dentata pennivenia.* Racemi *axillares simplices v. in paniculas terminales dispositi, v. paniculæ divaricate ramosæ.* Flores *ad axillam bracteæ parvæ sæpe inconspicuæ sessiles v. breviter pedicellati, solitarii v. fasciculati, singulive sæpius sub calyce minute bibracteolati.* Perianthium *sæpissime tomentosum v. pubescenticiliatum.* Ovarium *extus tomentosum v. villosum, intus plus minus villosum.*

Sectio I. BLACKWELLIA. Stamina tot quot petala singulatim iis opposita. Species omnes Gerontogeæ.

* *Paniculata.* Paniculis breviter divaricato-ramosis.

1. H. Nepalense. Foliis (amplis) petiolatis ovatis crenato-dentatis submembranaceis glabris, paniculis divaricato-ramosis, floribus breviter pedicellatis 6–7-meris, calycis segmentis linearibus petala oblonga tomentoso-ciliata subæquantibus.—*Blackwellia Napalensis*, DC. Prod. vol. ii. p. 54; Wall. Pl. As. Rar. vol. ii. p. 179.—Folia 3–5-pollicaria. Flores parvi, fere *H. paniculati.* Styli 3–4.

Hab. Nepaul, *Wallich.*

2. H. paniculatum. Foliis (amplis) petiolatis ovatis orbiculatis suboblongisve integerrimis subdentatisque coriaceis glabris nitidis, paniculis ramosis, floribus breviter pedicellatis 8–12-meris, calycis segmentis petalisque linearibus subæqualibus plumoso-hispidis.—*Blackwellia paniculata*, Lam., DC. Prod. vol. ii. p. 54. *B. integrifolia*, Lam. Ill. t. 412. f. 2; DC. *l. c.*; et (forma angustifolia) *B. glauca*, Vent. Choix, t. 55; DC. *l. c.*—Folia bipollicaria et majora, novella tenuia, adulta crasso-coriacea. Flores parvi eleganter plumosi. Styli 5, v. rarius 6?

Hab. Mauritius, *Bojer* and others.

3. H. rufescens. Foliis (parvis) petiolatis obovatis oblongisve submembranaceis nitidis glabris basi angustatis, racemis brevibus paniculatis, floribus pedicellatis 7–8-meris, calycis segmentis linearibus quam petala oblongo-linearia ciliata paullo brevioribus.—*Pythagorea rufescens*, E. Mey. Pl. Dr. exs. *Blackwellia rufescens*, Arn. in Hook. Journ. Bot. vol. iii. p. 149.—Flores parvi fere *H. paniculati.* Folia multo minora et tenuiora, vulgo $1\frac{1}{2}$–2 poll. longa, $\frac{3}{4}$ poll. lata, integerrima, v. sinuato-dentata. Styli 4–5.

Hab. Port Natal, *Drège, Gueinzius.*

** *Racemosa.* Racemis elongatis ad axillas solitariis v. ad apices ramulorum paucis subfasciculatis v. laxe subpaniculatis.

4. H. axillare. Foliis subsessilibus ovalibus oblongisve subcrenatis glabris, racemis elongatis, floribus (subsessilibus? 7-meris?), calycis segmentis petalisque linearibus ciliatis subæqualibus.—*Blackwellia axillaris*, Lam. Dict. vol. i. p. 420; et Ill. t. 412. f. 1. An etiam *B. gracilis*, Blum. Mus. Bot. vol. ii. p. 26, floribus pedicellatis?

Hab. Madagascar. I have seen no specimens; nor had Blume, it would appear, seen any authentic ones, of the original plant; and I strongly suspect that the discrepancies which he found between Lamarck's figure and the specimen he received from Paris, and which induced him to publish the latter as new, are owing to inaccuracies of the artist.

5. H. tomentosum. Foliis subsessilibus late obovatis repando-subcrenatis supra glabris subtus puberulis tomentosisve, racemis elongatis tomentoso-villosulis, floribus parvis glomeratis subsessilibus 5–6-meris, calycis tubo brevi, segmentis petala oblongo-linearia subæquantibus. *Blackwellia tomentosa*, Vent. Choix, t. 57; DC. Prod. vol. ii. p. 55.

B. spiralis, Wall. in As. Res.; DC. *l. c.* Folia 4–6-pollicaria. Flores in hac et sequente, minimi, numerosi. Styli 3–4.

Hab. Java, also Pegu, *Wallich*. Catal. no. 4897 A. in part.

6. H. LONGIFOLIUM, sp. n. Foliis petiolatis oblongis v. anguste obovato-oblongis subintegerrimis glabris, racemis elongatis tomentosis, floribus parvis glomeratis pedicellatis 6–8-meris, calycis tubo brevi segmentis linearibus quam petala lineari-cuneata vix brevioribus.—Folia 5–6 poll. longa, raro 2 poll. lata, subcoriacea, nitidula.

Hab. Penang, *Phillips*. Distributed also by Wallich with the last, under the name of *B. spiralis*, from the Calcutta Garden, Catal. no. 4897 A.

7. H. ZEYLANICUM. Foliis petiolatis ovali-ellipticis ovatisve acuminatis subdentatis demum coriaceis nitidis glabris, racemis elongatis tomentellis, floribus parvis glomeratis pedicellatis 4–6-meris, calycis tubo oblongo-turbinato, segmentis oblongis quam petala obovali-oblonga ciliata brevioribus.—*Blackwellia zeylanica*, Gardn. in Calc. Journ. Nat. Hist. vol. vii. p. 452. *B. tetrandra*, Wight, Ic. vol. v. t. 1851.—Folia pleraque 3–4-pollicaria, juniora membranacea. Styli 3–4.

Hab. East Indian Peninsula, Pulney Mountains, *Wight*; Concan, *Stocks*; Ceylon, *Walker, Gardner, Thwaites*.

8. H. AFRICANUM. Foliis breviter petiolatis ovalibus oblongisve dentatis glabris, racemis elongatis, floribus sessilibus glomeratis 5–7-meris, calycis tubo turbinato, segmentis acutis quam petala oblongo-cuneata multo minoribus.—*Blackwellia africana*, Hook. fil. Fl. Nigr. p. 361. —Folia 4–5-pollicaria. Styli 4–5.

Hab. Sierra Leone, *Don*; Lagos, *Barter*.

9. H. FAGIFOLIUM. Foliis breviter petiolatis ovalibus obovatisve dentatis membranaceis pubescentibus v. demum glabratis, racemis elongatis ramulisque pubescentibus, floribus pedicellatis sparsis 6–8-meris, calycis tubo anguste turbinato, segmentis lineari-cuneatis quam petala ciliata paullo minoribus.—*Blackwellia fagifolia*, Lindl. in Trans. Soc. Hort. Lond. vol. vi. p. 269. *B. padiflora*, Lindl. Bot. Reg. t. 1308. *B. Loureiri*, Benth. in Lond. Journ. Bot. vol. i. p. 482. *Astranthus cochinchinensis*, Hook. Bot. Mag. t. 2659 (foliis solito angustioribus), an Lour.?—Folia subtripollicaria. Styli vulgo 4.

Hab. South China. By a misprint, this species is called *B. pubiflora*, Lindl., by Walpers; and it is probably the same one also that Steudel, by some such mistake, has indicated under the names of *B. chinensis* and *B. grandiflora*.

Sectio II. RACOUBEA. Stamina ad quodque petalum 2–7 approximata v. fasciculata. Racemi simplices v. laxe subramosi, sæpius elongati.

* *Americana.*

10. H. RACOUBEA (*Sw.*, *DC. Prod.* vol. ii. p. 53). Foliis ovalibus oblongisve subacuminatis crenato-dentatis glabris nitidis, floribus subsessili-

bus 6–7-meris, calycis segmentis quam petala ovata minoribus, staminibus ad petala ternis, stylis 3 usque ad ovarium villosum distinctis. —*H. surinamense*, Steud. in Flora, 1843, p. 756.—Folia 3–4-pollicaria rarius longiora. Bracteæ et bracteolæ parvæ, sed evidentiores et diutius persistentes quam in 2 sequentibus. Perianthium post anthesin annulatim patens.

Hab. North Brazil and Guiana; on the Solimoes, *Spruce*; Surinam, *Hostmann*, no. 6 & 1053; British Guiana, *Rob. Schomburgk*, *1st Coll.* no. 225, *2nd Coll.* no. 883; *Rich. Schomburgk*, no. 1463.

11. H. RACEMOSUM (*Jacq.*, *DC. Prod.* vol. ii. p. 53). Foliis ovalibus oblongisve acuminatis crenato-dentatis glabris nitidis, floribus distincte pedicellatis 6–7-meris, calycis segmentis quam petala ovata paullo minoribus, staminibus ad petala ternis, stylis 3 usque ad ovarium villosum distinctis.—*H. Racoubeæ* valde affinis et vix nisi pedicellis differt. Folia sæpius paullo minora.

Hab. West Indies: Jamaica, *Purdie*, *Macfadyen*, etc.; Cuba, *Linden*, no. 2108; Guadaloupe, Dominica, Trinidad, etc.

12. H. DENSIFLORUM (*Spruce, Pl. Bras. exs.*). Foliis ovali-oblongis acuminatis crenato-dentatis subcoriaceis glabris nitidulis, floribus sessilibus 5-meris rarius 6-meris, calycis segmentis quam petala ovata pluries minoribus, staminibus ad petala ternis, stylis 3 basi in columnam glabram coalitis.—Folia 4–5-pollicaria. Flores quam in *H. Racoubea* paullo majores. Ovarii pars libera tubo striato æquilonga villosa, in stylum glabrum breviter trifidum abiens. Fructus ut in 2 sequentibus induratus (indehiscens?) medio perianthio patente annulatus.

Hab. Santarem, *Spruce*.

13. H. PEDICELLATUM (*Spruce, Pl. Bras. exs.*). Foliis oblongis acuminatis crenato-dentatis supra nitidis glabris subtus ad costam hirtellis, floribus pedicellatis 6–7-meris tomentellis, calycis segmentis quam petala ovata multo minoribus, staminibus ad petala subquinis, stylis 3 supra ovarium in columnam brevem coalitis.—Differt ab *H. racemoso* uti *H. densiflorum* ab *H. Racoubea* floribus majoribus, stylis basi coalitis et fructu indurato; et ab omnibus præcedentibus staminibus ut in sequente sæpius quinis (rarissime quaternis).

Hab. North Brazil and Venezuela, on the upper Rio Negro abundantly, *Spruce*, nos. 1489 and 3722.

14. H. SENARIUM (*DC. Prod.* vol. ii. p. 54). Foliis breviter petiolatis ovali-oblongis sinuato-dentatis glabris, floribus subsessilibus 6–8-meris dense tomentosis, calycis segmentis oblongis quam petala angustioribus, staminibus ad petala 5–6, stylis 3–4 usque ad ovarium distinctis.

Hab. Mexico, *Jurgensen* (without any no. in Herb. Hook.).

** *Gerontogea.*

15. H. VITIENSE, sp. n. Foliis ovatis vix coriaceis glabris, floribus subsessilibus 8–10-meris, calycis tubo oblongo-turbinato, segmentis linea-

ribus quam petala lineari-cuneata vix minoribus, staminibus ad petala 2–3-nis.—*H. fœtido* certe affine, sed distinctum videtur. Folia 2–3-pollicaria. Flores sessiliores, tubo longiore, calycis segmentis petalisque post anthesin longioribus et minus inæqualibus. Styli sæpius 4.

Hab. Naviti-Leon, one of the Feejee Islands, *Milne*. This species has quite the shuttle-cock flowers of several of the 1st Section.

16. H. FŒTIDUM. Foliis (amplis) ovali-ellipticis suboblongisve crenato-dentatis submembranaceis glabris v. ad costam puberulis, floribus glomeratis brevissime pedicellatis 6–10-meris, calycis tubo breviter turbinato, segmentis anguste linearibus quam petala oblongo-cuneata ciliata paullo brevioribus, staminibus ad petala subgeminis.—*Blackwellia fœtida*, Wall., Deless. Ic. vol. iii. p. 32, t. 53.—Folia 5–8-pollicaria. Racemi elongati tenuiter tomentelli. Flores parvi. Styli 3–4.

Hab. Indian Archipelago, Mergui, *Griffith*; Amboyna, *Roxburgh*; Moluccas, *Wallich*; Celebes, *Miq. Fl. Ned. Ind.*

17. H. ANGUSTIFOLIUM (*Smith, DC. Prod.* vol. ii. p. 54). Foliis subsessilibus anguste oblongis subdentatis glabris, racemis elongatis, floribus sessilibus 5–7-meris, calycis tubo turbinato, segmentis quam petala cuneato-oblonga multo minoribus, staminibus ad petala ternis. —Folia 2–5-pollicaria.

Hab. Sierra Leone, *Herb. Smith.*

18. H. PARVIFOLIUM (*Hook. fil.*). Foliis petiolatis parvis ovali-oblongis acuminatis vix dentatis glabris nitidis, floribus subsessilibus confertis 6–7-meris, calycis tubo breviter turbinato, segmentis post anthesin patentibus oblongis quam petala ovata inflexa sublongioribus, staminibus ad petala subquinis.—Folia 2-pollicaria. Racemus in specimine brevis densiflorus cano-tomentellus. Flores fere sequentis nisi minores. Styli brevissimi.

Hab. Borneo, *Lobb.*

19. H. GRANDIFLORUM, sp. n. Foliis breviter petiolatis amplis oblongis subintegerrimis coriaceis nitidis glabris, floribus pedicellatis 6–7-meris, calycis tubo breviter turbinato, segmentis post anthesin accretis oblongis patentibus quam petala ovata inflexa longioribus, staminibus ad petala sub-7-nis.—Folia pallida, rigida, 5–6-pollicaria. Racemi elongati cano-tomentosi. Flores sub anthesi circa 5 lin. diametro, petalis segmentisque calycinis patentibus parum inæqualibus. Post anthesin calycis segmenta usque ad 5 lin. longa glabriora tenuiora et stellato-patentia; petala paullo accreta supra ovarium arcte inflexa. Styli vulgo 5, breves.

Hab. Malacca, *Griffith.*

20. H. BRACTEATUM, sp. n. Foliis breviter petiolatis amplis ovatis oblongisve dentatis coriaceis nitidis glabris, floribus sessilibus 4–5-meris, calycis tubo breviter turbinato, segmentis post anthesin

ovatis inflexis quam petala obovato-oblonga accreta patentia dimidio brevioribus, staminibus ad petala subternis.—Folia 6–8-pollicaria. Racemi elongati cano-tomentosi. Bracteæ ovatæ concavæ quam in omnibus speciebus majores et diutius persistentes. Flores primo intuitu iis *H. grandiflori* similes, sed paullo minores et petala nec calycis segmenta stellato-patentia, dum hæc uti petala *H. grandiflori* supra ovarium inter petala arcte inflexa sunt.—Styli 4–5.

Hab. Philippine Islands, *Cuming*, no. 1109.

21. H. CARYOPHYLLACEUM. Foliis subsessilibus ovalibus obovatisve subcrenatis coriaceis glabris, floribus subsessilibus 5–6-meris, calycis tubo oblongo-turbinato, segmentis acutis quam petala ovali-oblonga vix brevioribus, staminibus ad petala ternis.—*Blackwellia caryophyllacea*, Zoll. et Mor. Verz. p. 33.—Folia per anthesin pauca supersunt, novella nondum evoluta ex Miq. 3-pollicaria. Racemi breves confertiflori. Flores 2 lin. longi. Ovarii pars libera tubo multo brevior. Styli 3–4.

Hab. Java, *Zollinger*, no. 958.

22. H. CORDYLANTHUS. Foliis breviter petiolatis ellipticis v. oblongis superne dentatis coriaceis glabris, floribus subsessilibus 3–6-meris, calycis tubo elongato, segmentis acutis quam petala ovali-oblonga paullo brevioribus, staminibus ad petala 3–4.—*Cordylanthes frutescens*, Blume, Mus. Bot. vol. ii. p. 28. t. 3. *Blackwellia longiflora*, Miq. Fl. Ned. Ind. vol. i. p. 715.

Hab. Java, *Blume*. I have not seen this plant. From Blume's description, it scarcely differs from the *H. caryophyllaceum* except in the still longer tube of the calyx.

Species dubiæ v. excludendæ.

ASTRANTHUS COCHINCHINENSIS, Lour. Fl. Cochinch. p. 225 (*Blackwellia cochinchinensis*, Bl. Mus. Bot. vol. ii. p. 27), is probably not distinct from *H. fagifolium*.

BLACKWELLIA MOLUCCANA, Bl. Mus. Bot. vol. ii. p. 27, founded upon the figure and description in Rumphius, Amb. vol. iii. p. 25. t. 11, appears to me scarcely to belong even to the order.

PYTHAGOREA COCHINCHINENSIS, Lour. Fl. Cochinch. p. 244, has been supposed to belong to *Blackwellia*, but nothing certain can be made out of his description. The "germen medium inter calycem et corollam" and "Capsula 4-locularis polysperma" are quite discordant with any *Homalineæ*.

BLACKWELLIA CERASIFOLIA, Vent., DC. Prod. vol. ii. p. 54, has an entirely free ovary, with the placentas extending to the base of the cavity. It cannot therefore remain in *Homalium*. It is probably the Madagascar genus with a free ovary, alluded to by Brown.

On East Indian *Salices*. By Dr. N. J. ANDERSSON, Professor of Botany in the University of Stockholm. Communicated by Dr. J. D. HOOKER, F.R.S., F.L.S.

[Read June 16, 1859.]

IN the Transactions of the Royal Swedish Academy of Sciences (Kongl. Wet. Akademiens Handlingar), 1850, pp. 465–502, I have already given a Synopsis of the Willows then known from the East Indies. Before that time, Roxburgh ('Plants of the Coast of Coromandel,' 1795) had described and figured *S. tetrasperma*; Don ('Prodromus Floræ Nepalensis,' Lond. 1825), *S. disperma*, *S. cuspidata*, and *S. japonica*; Fries (Nov. Fl. Suec. Mont. i., 1832) *S. nobilis* and *S. lenta*; and Wallich ('A Numerical List of Dried Specimens of Plants,' &c.) enumerated *S. Lindleyana*, *S. obovata*, *S. elegans*, *S. grisea*, *S. Kamanensis*, *S. eriostachya*, *S. pyrina*, *S. glabrescens*, *S. urophylla*, *S. calophylla*, *S. densa*, and *S. babylonica*.

During a tour to the Continent and England, in the year 1850, I had opportunity to examine almost all these species: at Berlin I determined the few forms brought from the Himalaya by W. Hofmeister in the expedition of Prince Waldemar of Prussia; in Paris I saw the collections of Jacquemont and Perrottet; and in London Mr. Kippist gave me a liberal access to the East Indian herbarium of the Linnean Society. Upon those materials was that Synopsis founded. I there gave diagnoses and descriptions of twenty-five species, to which were added a few "incertæ" and "dubiæ."

Now, having been so fortunate as to make use of the extremely rich collections formed in that vast land, and in the higher regions of the Himalaya mountains by Dr. J. D. Hooker and Dr. T. Thomson, of which the *Salices* were handed over to me by the generosity of Sir William Hooker and Dr. Hooker, I not only have had occasion to review the previously published determinations, but also to describe a very considerable number of new forms.

The species proposed in this paper are as follow:—

I. AMERINA.

* *Polyandræ.*

1. S. tetrasperma, *Roxb.*
   S. pyrina, Wall.
   S. urophylla, Lindl.
   S. suaveolens, Ands.
   S. ichnostachya, Lindl.
   S. nobilis, Fr.
2. S. calostachya, *Ands.*
3. S. apiculata, *Ands.*
4. S. glaucophylla, *Ands.*

** *Fragiles, diandræ.*

5. S. dealbata, *Ands.*
6. S. sericocarpa, *Ands.*
7. S. babylonica, *L.*

II. Helices.

8. S. pycnostachya, *Ands.*
9. S. oxycarpa, *Ands.*
10. S. eriostachya, *Wall.*

III. Vetrices.

* *Amentis ♀ sessilibus nudis.*

11. S. daphnoides, *L.*, indica.
12. S. insignis, *Ands.*
13. S. viminalis, *L.*
14. S. Smithiana, *Willd.*
15. S. populifolia, *Ands.*

** *Amentis pedunculatis.*

16. S. eriophylla, *Ands.*
17. S. Daltoniana, *Ands.*
18. S. longiflora, *Wall.*

IV. Capreæ.

* *Cinerascentes, stylo nudo.*

19. S. Caprea, *L.*
20. S. julacea, *Ands.*
21. S. Wallichiana, *Ands.*

** *Virescentes, stylo producto.*

22. S. hastata, *L.*
23. S. elegans, *Wall.*
24. S. myrtillacea, *Ands.*

V. Frigidæ.

25. S. sclerophylla, *Ands.*
26. S. myricæfolia, *Ands.*
27. S. fruticulosa, *Ands.*

VI. Glaciales.

28. S. flabellaris, *Ands.*
29. S. Thomsoniana, *Ands.*
30. S. calyculata, *Hook. f.*
31. S. Serpyllum, *Ands.*
32. S. Lindleyana, *Wall.*
33. S. oreophila, *Hook. f.*
34. S. secta, *Hook. f.*

By this enumeration it may be seen that there are five European species also found in the East Indian Alps, viz. *S. daphnoides*, *S. viminalis*, *S. Smithiana*, *S. Caprea*, and *S. hastata*. But, with the exception of *S. hastata*, all the others have been determined upon a few and scarcely complete specimens. Of the rest, *S. babylonica*, *S. dealbata*, *S. glaucophylla*, and *S. sericocarpa* truly are allied to the species (*S. acmophylla*, *S. babylonica*, and *S. octandra*) of Western Asia; *S. tetrasperma* proves to be the form most peculiar to the East Indies, where it offers a great variety of interesting forms, quite as, in our own country, *S. pentandra*, with which it is somewhat analogous. *Helices*, indeed, differ from our species, although *S. pycnostachya* seems to belong to the series of *S. purpurea*, and *S. eriostachya* to that of *S. rubra*. Amongst *Vetrices*, the groups of *S. daphnoides* and *S. viminalis* are each represented by three or four species; and of *Frigidæ* and *Glaciales*, all seem to be peculiar to the Himalayan mountains.

1. SALIX TETRASPERMA, *Roxb.* S. amentis lateralibus pedunculatis, masculis longis laxis rarifloris, femineis cylindricis subdensifloris elongatis, pedunculo foliis 3–6 instructo; squamis oblongo-spathulatis griseo-puberulis; nectario pedicello sexies breviore; capsula longe pedicellata ovata glabra, stylo minimo, stigmatibus divisis; foliis ovato-lanceolatis elongatis longe acuminatis subtus plerumque glaucis integerrimis.

S. tetrasperma, *Roxb. Pl. of the Coast of Coromandel*, i. p. 66. tab. 97; *Wallich, Catalog. Pl. Ind. oriental.* no. 3707; *Ands. Ostindiens Pilar* (*Acta Holm.* 1850, p. 484. no. 14).—S. Hugelii, *Wimm. herb. Berol.* —S. nilagirica, *Miquel* (*Hohenacker, Pl. Indiæ or.* 1851).

Hab. Ad ripas et in locis humidis per totam (Indiam orientalem ?) Nepaliam, ut videtur subfrequens. In montibus Nilagiri, Khasia reg. trop. alt. 2–4000 ped. (*Hook. et Thomson*). Nullam aliam se invenisse monet Roxburgh. Tempore frigido floret.

Hæc *Salix* formis numerosis (ut e collectione ditissima ill. *J. D. Hookeri* certior factus sum) mire ludit, et centrum, ut ita dicam, efficit *Salicum* Indiæ orientalis vere indigenarum et huic terræ propriarum; quare sequentes, a forma typica plus minus recedentes, meras varietates censeo.

**S. pyrina*, Wallich (Catal. n. 3705). Amentis breviter pedunculatis subrarifloris acutiusculis excurvatis, pedunculo paucifoliato, squamis subdeciduis spathulatis cinerascenti-pilosis; nectario pedicello capsulæ quadruplo breviori; capsula ex ovata basi attenuata, stylo subnullo; foliis lanceolatis acutis subtus cinereis.—Ands. *l. c.* p. 486. no. 15.

Hab. In Nepalia (*Perrottet, Wallich*).

** *S. urophylla*, Lindl. (Herb. Soc. Linn.). Amentis foliis parvis suffultis arrectis curvatis obtusiusculis; squamis incano-pilosis; capsulis ovato-lanceolatis glaberrimis, pedicello nectarium bis terve superante, stylo brevi, stigmatibus bipartitis excurvatis; foliis glabrescentibus lanceolatis.—Wallich, Catal. no. 3708; Ands. *l. c.* p. 487. no. 16.

Hab. Ind. orient., Oude (*Wallich*).

*** *S. suaveolens* (Ands. *l. c.* p. 491. no. 19). Amentis ♂ suaveolentibus pedunculatis strictis elongatis, pedunculo foliato; squamis latissime ovatis convexis aureo-fulvis hirsutie densa albo-tomentosis, apice summo nudis; staminibus 8–10, filamentis tenuissimis inferne barbatis, antheris globosis; foliis e basi subovata longissime acutatis glaberrimis subtus glaucescentibus, coriaceis.—*S. Myurus*, Wimm. (herb. Vindob.).

Hab. Ad Ajnir leg. *V. Jacquemont* (Voyage aux Indes or., no. 96). Himalaya, *Hugel*, no. 526.

**** *S. ichnostachya* (Lindl. hb. Wight.). Amentis pedunculatis, masculis patentibus, pedunculo foliis 2–4 instructo; squamis ovato-rotundatis dense crispo-villosis; stam. octo, filamentis basi barbatis;

foliis lanceolatis acutato-acuminatis integerrimis subtus glaucis.—Wall. Cat. no. 3702; Ands. *l. c.* p. 488. no. 17.

Hab. Ad Karikal, prope Pondichery (*Perrottet*), Nepalia (*Wallich*).

***** *S. nobilis*, Fr. Amentis subpedunculatis erectis, foliis minutis deciduis bracteatis, fem. subdensifloris, masc. rarifloris; squamis parvis rotundatis dorso glabriusculis; capsulis ovato-subulatis sæpius glabris, pedicello nectarium superante, stylo longissimo, stigmatibus fissis linearibus; foliis oblongo-lanceolatis adpresse serrulatis glabratis lucidis.—Ands. *l. c.* p. 492. no. 20.

Hab. In Nepalia (*Wall. herb. Hornem.*).

Descriptiones completiores harum omnium formarum in Act. Holm. *l. c.* jam prius dedimus.

Ad hanc speciem eximie polymorpham forsan etiam pertinent sequentes, de quibus autem valde dubitans sum:

(1.) *S. disperma*, Don (Prod. Fl. Nepal. p. 58). "Octandra: amentis masculis prælongis villosis; squamis obtusis; ovariis ventricosis tomentosis, stigmatibus 2 linearibus apice incrassatis emarginatisque; foliis ellipticis integerrimis mucronatis utrinque ramulisque sericeo-villosis."—Roxb. MSS.; Ands. *l. c.* p. 500. no. 26.

Hab. In Nepalia (*Hamilton*).

(2.) *S. lenta*, Fr. (Nov. Fl. Suec. Mont. i. p. 78). "Foliis lanceolatis remote glanduloso-dentatis subtus villosulis canescentibus, stipulis lanatis, amentis subpedunculatis, bracteis deciduis, masc. arcuatis diandris (?), capsulis pedicellatis subulatis sericeis, stylo brevi, stigmatibus emarginatis."—Ands. *l. c.* p. 501. no. 28.

Hab. Etiam in Nepalia.

(3.) *S. calophylla*, Wall. *l. c.* no. 9102; Ands. *l. c.* p. 502.

(4.) *S. densa*, Wall. *l. c.* p. 9103; Ands. *l. c.* p. 502.

(5.) *S.* ——, Wall. *l. c.* no. 9105; Ands. *l. c.* p. 502.

(6.) *S. pseudogrisea*, Steudel (*S. grisea*, Wall. no. 3700 D, herb. Berol. et Vindob.).

2. S. CALOSTACHYA, *Ands.* (*l. c.* p. 489. no. 18). Amentis sessilibus longe cylindricis flexuosis densifloris; squamis parvis fulvis, pilis albido-griseis hirsutis, pedicello brevioribus; nectario minutissimo; capsula pedicellum elongatum filiformem æquante glabra, stylo nullo, stigmatibus erectis; foliis ovato-lanceolatis undulatis subtus argenteis glaucis.

Hab. In sylvis humidis, 2000 metr. elevatis Indiæ orient. a Kahouta ad Mahabad (*Jacquemont*, *Voy.* no. 250).

Descriptionem in Act. Holm. *l. c.* vide.

3. S. APICULATA, *Ands.* (*l. c.* p. 470. no. 1). Amentis pedunculatis erectis, foliis paucis suffultis, fem. subdensifloris; squamis caducis, apice obtuso, glabriusculis; capsulis conicis glabris, pedicello nectarium unicum bis superante, stylo mediocri, stigmatibus

divisis; foliis ovato-lanceolatis, apice longe producto, acuminatis nitentibus.

S. cuspidata, *D. Don, Prodr. Fl. Nepal.* p. 58; *Wallich, l. c.* no. 3703.

Hab. Sirinagur (*D. Kamroop*), Nilgherry (*Noton*).

Descriptionem in Act. Holm. *l. c.* dedi.—Nonne autem *S. tetraspermæ* varietas?

4. S. GLAUCOPHYLLA, *Ands.* (*l. c.* p. 474. no. 7). Amentis foliato-pedunculatis erectis, femineis cylindricis rarifloris obtusiusculis; squamis subpersistentibus ovatis dense albo-villosis; nectario lato pedicello capsulæ quadruplo breviori; capsula pedicellata globoso-conica acuta glaberrima; stylo subnullo, stigmatibus brevibus; foliis elongato-lanceolatis glaberrimis integerrimis subtus glaucis.

Ex India orientali reportavit *Jacquemont.*

Hæc species *S. octandræ* (Sieb.) sine ullo dubio valde affinis est, quæ tamen sat aperte differt: amentis crassioribus magisque densifloris, capsulis brevioribus, necnon foliis vulgo latioribus, serratis, subconcoloribus.

Descriptionem in Act. Holm. *l. c.* vide.

5. S. DEALBATA, *Ands.* (*l. c.* p. 472. no. 1). Amentis pedunculatis brevibus obtusis subdensifloris; pedunculo 1–3-foliato; squamis deciduis obovatis pubescentibus; nectario lato brevi subbifido; capsula pedicellata ovato-conica, glaberrima; stylo mediocri, stigmatibus erectis; foliis lanceolato-linearibus integerrimis subtus glaucescentibus demum dealbatis.

Hab. Inter Saharnpora et pedem montium Sulin Nauka et Mohur; in planitie secus torrentem ad Ghautka-ware (*Jacquemont*).

Descriptionem in Act. Holm. *l. c.* vide.

Habitu *S. albæ* v. *babylonicæ*, a quibus differt foliis omnino glaberrimis, sensim angustatis nec ita acuminato-productis, amentis brevioribus, capsulis evidenter pedicellatis. Magna etiam cum *S. acmophylla* Boiss. est affinitas, quæ tamen amentis globosis, densifloris, squamis glabriusculis et capsulis quodammodo differt. Tribus autem *S. albæ* et *babylonicæ* in Asia occidentali vere indigena ibi magis quam apud nos variis ludit formis.

6. S. SERICOCARPA, *Ands.* Amentis breve pedunculatis foliis parvis suffultis angustis elongatis flexuosis; squamis concoloribus glabris lineari-spathulatis; stam. geminis; capsulis sessilibus tenuiter sericeis conico-rostratis stylo producto bifido, stigmatibus integris erectis; foliis anguste lanceolatis utrinque glaberrimis apice producto subobliquis integris subtus glaucescentibus.

Hab. Kaschmir, reg. alp., alt. 6000 ped. (*Thomson*).

Arbor videtur, ramis erectis, subvimineis, cortice fusco-castaneo glabro obductis. Folia 2–3 pollices longa, vix semipollicem lata, basi attenuata, apice angustato-cuspidata, supra viridia, subtus læte glauca,

utrinque glaberrima, margine integerrima vel rarius minute serrulata. Amenta lateralia, pedunculo semipollicari insidentia, patentia, foliis 2–7 parvis integris oblongis suffulta; mascula $1\frac{1}{2}$ pollicem longa, rectiuscula, rachi hirsuta, squamæ testaceo-pallidæ, stamina gemina, filamentis squamas subtriplo superantibus glabris filiformibus, antheris minutis flavis; am. fem. laxe flexuosa, 2–3 pollices longa, rachis hirsuta, squamæ obtusiusculæ apice fusciores, capsulæ lineam longæ conicæ tenuiter incano-sericeæ, nectario ventrem capsulæ tegente, stylo luteo ad medium fisso, stigmatibus infuscatis.

Primo obtutu, *S. albæ* nostræ similis, abunde autem differt capsulis et squamis, necnon foliis.

7. S. BABYLONICA, *L. Sp. Pl.* 1773; *Ands.* (*l. c.* p. 472. no. 2); *Don, Prodr. Fl. Nep.* p. 59.—S. japonica, *Thbg.*, *Ands.* (*l. c.* p. 501. no. 27).

Hab. Kera, Tunbury, *Jacquemont*; Narainhetty Nepaliæ, *Hamilton*.

8. S. PYCNOSTACHYA, *Ands.* Amentis sessilibus foliis nullis suffultis; staminibus monadelphis, antheris quadrilocularibus; squamis arctis obtusiusculis apice fuscioribus basi pilosis; capsulis sessilibus ovatis glabris, stylo subnullo, stigmatibus brevibus erectis bifidis; foliis lanceolatis obtusis basi angustatis planis integerrimis utrinque glabris vel junioribus subtus præsertim sericeis.

Hab. In India orientali: Gauskar, reg. alp., alt. 13,000 ped. (*Thomson*).

Frutex fere orgyalis. Rami ramulique divaricati, cortice atro-violaceo obsolete glaucescenti-irrorato lucido obducti. Stipulæ obsoletissimæ aut cito caducæ. Folia fere 2 pollices longa, supra medium vix semiunciam lata, basin versus sensim angustata, apice obtusata, omnino plana, submollia, margine integerrima, juniora pilis brevibus adpressis utrinque albo-sericea, adulta glabrata, utrinque læte viridia costa dilutiori venisque ex siccatione fuscescentibus rectiusculis subsimplicibus percursa; petiolus $2\frac{1}{2}$ lin. longus, puberulus. Gemmæ ovato-rotundatæ, fusco-castaneæ, omnino glabræ. Amenta lateralia præcocia, arrecto-patentia, pedunculo 2–3 lin. longo villoso insidentia, bracteis minimis dense tomentosis suffulta, densiflora, obtusa. Amenta mascula, $1\frac{1}{2}$ pollicem longa, cylindrica, rachis hirsuta; squamæ spathulato-obovatæ filamentum ad medium tegentes, brunnescentes, pilis longis albidis conspersæ; filamenta duo concreta pallide flava, basi parcissime pilosa; anthera quadrata aurea. Amenta fem. excurvata, $1\frac{1}{2}$–2 pollices longa, cylindrica vel apicem versus fere incrassata, valde densiflora; rachis pilosa; squamæ obovato-rotundatæ basi fulvescentes, pilis longis hirsutæ, supra medium castaneo-fuscæ, glabræ vel pilis pallidis ciliatæ, capsulis plus quam duplo breviores; nectarium punctiforme, glabrum, pilis conditum, basin capsulæ vix attingens; capsula sessilis, $1\frac{1}{3}$ lin. longa, ovato-oblonga, basi gibba, acutiuscula; stylus brevissimus in stigmata brevia bipartita arrecta cyathi instar dilatatus, flavus.

Est in tribu sua habitu prorsus peculiari, hinc ad *S. rubram*, staminibus

monadelphis, foliis lineari-lanceolatis, interdum sericeo-pubescentibus, illinc ad *S. daphnoidem*, nempe amentis sessilibus valde densifloris, capsulis glabris viridulis et ramis adultis nonnunquam glauco-irroratis, accedens. Sed ab utraque magnopere differt; a *S. rubra* foliis non longe productis obtusis integerrimis, planis, stipulis nullis, capsulis glabris, stylo brevi et stigmatibus crassis; a *S. daphnoide* foliis, stigmatibus et stylo necnon staminibus.

9. S. OXYCARPA, *Ands.* Amentis lateralibus præcocibus sessilibus elongatis laxe flexuosis; staminibus 2, filamentis ad medium connatis; capsulis sessilibus conico-elongatis acutis sericeo-puberulis, stylo subnullo, stigmatibus brevissimis subclavatis; foliis lanceolatis acutiusculis tenuibus, adultis rigidis glabre nitentibus, subintegris subtus glaucescentibus.

Hab. Kischtwar, reg. temp. alt. 6–11,000 ped. (*T. Thomson*).

a. angustifolia: foliis anguste lanceolatis subtus glaucescentibus, squamis capsularum acutiusculis fuscis.

b. latifolia: foliis late lanceolatis v. oblongis subtus pallidioribus, squamis caps. rotundatis fulvescentibus.

Frutex plus quam orgyalis. Rami erecti, crassiusculi, in speciminibus masculis a me visis molliter incano-pubescentes, brunnei, in spec. fem. omnino glabri, rufescentes. Gemmæ minutissimæ, acutiusculæ, sero evolutæ. Stipulæ anguste lanceolatæ, petiolo lineam longo vix longiores, plerumque mox caducæ. Folia 3 pollices longa, pollicem lata, supra medium nonnihil latiora, ceterum æqualiter attenuata, plana, margine integra vel apicem versus minute et remote glanduloso-serrulata, juniora pellucida, pilis nitentibus adpressis præsertim secus costam obtecta, demum utrinque glaberrima vel infra obsoletius puberula, supra læte viridia, subtus opace glaucescentia, costa sola distincta; petiolus lineam longus, cano-tomentosus; folia novella oblonga, obtusa, pilis adpressis plus minus dense obtecta. Amenta lateralia, præcocia, pedunculo 3 lineas longo vel immo breviori insidentia, bracteis 2–4 vix unciam longis subtus sericeis oblongis vel obovatis suffulta. Amenta mascula patentia vel immo subrecurvata, crasse cylindrica, obtusa, densiflora, 2 pollices longa; rachis hirsuta; squamæ staminibus triplo breviores, obovato-rotundatæ, fusco-castaneæ, pilis cinereis squamarum longitudine corrugatis ciliatæ; stamina 2, filamentis usque ad medium connatis glabris flavis, antheris subrotundatis aureis. Amenta feminea arrecta vel laxissime patentia et curvato-flexuosa, 3–4 pollices longa, acutiuscula; rachis pubescens; squamæ ut in am. ♂ sed pallidiores, capsulis quadruplo breviores; nectarium squama triplo brevius, glabrum; capsula sessilis, ex ovata basi conico-attenuata, fere 2 lin. longa, apice acutata, tomento sericeo tenui pubescens, stylo parvo sed distincto, stigmatibus brevibus integris crassiusculis erectis.

Quoad folia hæc salix pulcherrima *S. phylicæfoliæ* vel potius *S. laurinæ angustifoliæ* simillima videtur; amenta feminea non ab iis harum

specierum multum aberrant; adsunt autem capsulæ sessiles stylo minuto rostratæ; præterea stamina monadelpha? Cum speciebus ad Helices vulgo relatas hæc nostra ceterum parum habet commune. E *S. cinerea* et *S. laurina* quasi composita videtur! Et ob id *S. julacea* nostra huic quam maxime affinis; quæ tamen differt foliis frequentius hirsutis vel sericeis, capsulis adhuc longius attenuatis et stigmatibus prorsus sessilibus.

Huc sine dubio ea Salicis species referenda est, quam nomine *S.* (*phylicæfolia*) *macrocarpa*, *l. c.* p. 449. no. 11, "in frigidis umbrosis et fertilibus a Stari ad Korenass," lectam a Jacquemont, fusius descripsi. Cui etiam forsitan est associanda *S. glabrescens* Lindl. "in Oude et Rohilcund," Wallich (Catalog. no. 3706).

a. breviuscula amentis fere duplo brevioribus; capsulis tomento sericeo tenuiori parcius puberulis, demum fere glabratis; foliis anguste lanceolatis, margine sæpius remote serrulatis, utrinque glabris, subtus glaucescentibus.

Hab. Janskar, reg. alp., alt. 10–17,000 ped. (*Thomson*).

Non absque hæsitatione permulta hanc formam *S. oxycarpæ* subsumendam suspicor. Recedit quidem foliis, ramis angustioribus cortice fusco obductis, totoque habitu, nullis autem notis amentorum et capsularum ab ea distingui potest. Ad *Salicem rubram* foliorum forma nonnihil appropinquat.

b. serratifolia: foliis 3-pollicaribus exacte lanceolatis cuspidato-productis, venis et costa flavescentibus elevatis pulchre et regulariter striatis, subtus intense glaucis, margine minute sed satis acute glanduloso-serrulatis; amentis (defloratis) 4–5 pollices longis, laxissimis.

Hab. Linla, reg. temp., alt. 8000 ped. (*Thomson*).

Quoad folia hæc speciei forma *S. daphnoidi* ita est similis, ut ab ea non nisi amentis longissimis, breve sed distincte pedunculatis et foliis parvis suffultis, capsulis breve pedicellatis, conico-rostratis, squamis denique testaceis glabriusculis differt.

10. S. ERIOSTACHYA, *Wall.* (*l.* c. no. 3704). Amentis lateralibus, femineis densifloris; pedunculis foliatis; squamis obovato-rotundatis pilosiusculis; nectario ventrem capsulæ attingente; capsula sessili ovato-conica albo-villosa, stylo elongato, stigmatibus bipartitis; foliis subovalibus obtusiusculis integerrimis subtus glaucis.—*Ands. l. c.* p. 493. no. 21. Descriptionem *l. c.* etiam vide.

Hab. In Nepalia, ad Gossain Than.

Distinctissima species ob amenta capsulasque cum nulla alia confundenda. Foliis tamen cum *S. daphnoide*, amentis cum *S. rubra* nonnihil commune habet.

11. S. DAPHNOIDES, *L.*; v. INDICA, *Ands.* (*l.* c. p. 475. no. 5).

Hab. In summa valle Jumnath, supra fontem thermalem, 2500–3300 metr. alt. (*Jacquemont*).

Specimina hic lecta a vera *S. daphnoide* non parum discrepant: amentis magis excurvatis, squamis longioribus acutatis, stylo valde producto, foliisque utrinque viridibus, tenuioribus.

Alia ad "Banhatta, 2952 metr." etiam a Jacquemont lecta, cum *S. daphnoide* subbene congruunt.

12. S. INSIGNIS, *Ands.* Amentis sessilibus e gemmis magnis erumpentibus basi nudis, masculis crassis, squamis atris flavescenti-pilosis, staminibus geminis; femineis laxe erectis elongato-cylindricis acutiusculis, squamis atris obtusis glabriusculis, capsulis breve pedicellatis conicis sericeis, stylo evidenti, stigmatibus crassiusculis erectis; foliis lanceolatis tenuiter serratis rigidis subtus glaucescentibus, stipulis semicordatis acutis persistentibus.

Foliis latioribus glabris.

Hab. Kaschmir, reg. temp., alt. 6–8000 ped. (*Thomson*).

Foliis angustioribus, longius acuminato-cuspidatis, utrinque cinereo-tomentosis.

Hab. Tibet. occident., reg. temp., alt. 6–8000 ped. (*Thomson*).

Arbor vel frutex videtur sat altus. Rami validi, cortice rufo-fusco vel castaneo glabro nitente rarissime glaucescente obducti. Gemmæ ovato-conicæ apice acuto incurvæ intrafoliares pedunculo subduplo breviores fusco-castaneæ glabræ vel hirsutie parca puberulæ, floriferæ late ovatæ 2–3 lineas longæ glabræ castaneæ. Folia 3 pollices longa, ad medium pollicem lata, exacte lanceolata, basi et apice æqualiter angustata, margine glanduloso-serrata serraturis subdepressis, supra læte viridia nitentia costa et venis regulariter arcuatis dilutioribus percursa, subtus pallidiora vel glaucescentia costa et venis striata; pedunculus 2 lin. longus, basi dilatatus gemmam amplectens. Stipulæ semi-ovatæ vel late lanceolatæ basi obsolete cordatæ, longissime cuspidatæ, erectæ, latere exteriori arcuato minute serrulatæ, glabræ vel hirsutæ. Amenta mascula pollicem longa ovato-oblonga vel oblongo-ovalia, omnino sessilia, foliis vel bracteis nullis sed perulis magnis sat diu persistentibus suffulta; squamæ ovato-ovales, obtusæ, aterrimæ, pilis longis cinereo-flavescentibus utrinque sericeæ; stamina gemina, squamas triplo superantia, filamentis flavis, antheris minutis fulvescentibus. Amenta feminea etiam sessilia foliis nullis sed bracteis paucis et parvis villosis suffulta, cylindrica apicem versus angustiora laxe flexuosa, sæpe 2 pollices longa, 2–3 lin. lata; squamæ lanceolatæ acutiusculæ atræ, pilis paucis et brevissimis vel plane nullis basi conspersæ; capsulæ anguste conicæ rostratæ, tenuiter griseo-sericeæ, pedicello nectarium bis superante pallido, stylo parum producto sed conspicuo etiam pallidiori, stigmatibus crassis integris erectis.

Hæc species ex habitu ad *S. daphnoidem* aperte pertinere videtur præsertim quoad folia, gemmas et stipulas, amenta etiam mascula illius sat similia sunt; differt autem amentis femineis longis laxis, squamis atris nudis nec longe pilosis, capsulis evidenter pedicellatis. Eo respectu, ut etiam stylo minuto et amentorum habitu ad Capreas vergit.

13. S. VIMINALIS, *L. Sp.* 1448; *Ands. l. c.* p. 475. no. 6.
Hab. A Castris ad Hirpour (*Jacquemont*).

14. S. SMITHIANA, *Willd. Enum. H. Berol.* ii. p. 1008.
Hab. Sikkim, reg. temp., alt. 5–8000 ped. (*J. D. Hooker*).
Specimen tantum foliiferum in herb. Hooker. vidi, quod non sine dubio ad hanc speciem referendum puto.

15. S. POPULIFOLIA, *Ands. l. c.* p. 497. no. 22. Amentis sessilibus densifloris cylindricis obtusis foliis minoribus bracteatis; squamis oblongis tomentosis; nectario minuto pedicellum brevissimum capsulæ superante; capsula subsessili globoso-conica albo-lanata; stylo nullo, stigmatibus cruciatis; foliis longissime petiolatis ovalibus tenuibus glabrescentibus acute crenatis.
Hab. In India orientali legg. *Perrottet et Jacquemont.*
Descriptionem in Actis Holm. *l. c.* dedi.

16. S. ERIOPHYLLA, *Ands.* Amentis breve pedunculatis subcoætaneis foliis parvis suffultis; capsulis sessilibus obtusis tomento albescenti lanatis squamas villosas quadruplo superantibus; stylo profunde bipartito, stigmatibus bifidis erectiusculis fuscis; foliis lanceolatis acutis subtus argenteo-tomentosis margine dentatis supra rugose venosis.
S. psilostigma, Ands. *l. c.* p. 496. no. 23.
Hab. Khasia, reg. temp., alt. 4–5000 ped. (*J. D. Hooker et Thomson*).
In collectione Jacquemontii Parisiis vidi, sed tantum specimina manca.
Frutex sat altus, facie omnino *S. viminalis*. Rami dense foliati, cortice fusco-cinerascente glabro (in ramis floriferis) vel tomentoso (in ramis foliatis) obducti. Folia novella subtus adpresse argenteo-villosa costa prominula, supra obscure viridia parce pilosa, margine integro exsiccatione revoluta, exacte lanceolata, etiam basi æqualiter angustata; adulta 2½–4 pollices longa, petiolo lineam longo basi dilatato breve petiolata, erecto-patentia, infra medium subovata, inde longius attenuata, apice recto acuta, margine angustissime subrevoluto dense sed non profunde denticulata, subtus tomento non plane adpresso opace argenteo plerumque micante densissime vestita, costa lata pallidiore et venis distinctioribus prominulis percursa, supra saturate viridia tomento raro adpresso sub lente distincto mollia, costa pallidiori medio lineata venis lateralibus ante marginem incurvatis medio partitis impressis rugosa. Stipulæ in ramis vegetis et surculis persistentes, ex ovata vel etiam subcordata basi acutatæ, 3–4 lin. longæ, infra medium 2–3 lin. latæ, subobliquæ, nervis impressis rugosæ, margine subreflexo dentato, subtus albo-tomentosæ. Gemmæ ovato-globosæ, cano-hirtæ, petiolum (a quo basi inclusæ sunt) longitudine æquantes. Amenta lateralia pedunculo semipollicari insidentia, arrecta vel incurvato-patentia; folia bracteantia 4–5 minuta plerumque semipollicaria, apicem versus latiora, ceterum foliis novellis similia. Amenta mascula pollicaria,

rectiuscula, anguste cylindrica, densiflora, e basi primo florentia, obtusa; rachis hirsuta; squamæ obovato-rotundatæ, castaneo-fulvescentes, utrinque sed extus longius albo-villosæ; stamina 2, squamas duplo tantum superantia; filamenta tota pilis albis hirta; antheræ parvæ aureæ. Amenta feminea $1\frac{1}{2}$–2-pollicaria, patentia, rectiuscula v. subflexuosa, anguste cylindrica, obtusa, densiflora; rachis cinereo-tomentosa; squamæ capsulis fere duplo breviores, pallide fuscæ, obovato-rotundatæ, extus pilis albescentibus sat longis villosissimæ; nectarium porrectum, capsulæ dimidia longitudine, glabrum, fuscum, truncatum; capsula vix semilineam longa, ovato-conica obtusissima v. subglobosa, omnino sessilis, pilis albis opace sericeo-micantibus densissime vestita; stylus fuscus fere usque ad basin partitus et pilis capsulæ fere obtectus; stigmata in singulo stylo duo, testacea, stylis triplo breviora, divaricata.

Quod ad folia hæc species *S. viminalem* v. *stipularem* valde simulat; fabrica autem amentorum longissime ab ea differt.

17. S. Daltoniana, *Ands.* Amentis pedunculatis foliis bracteatis longissimis laxiusculis; squamis capsulas ultra medium tegentibus pilosis; capsulis primo sericeis demum glabratis conico-rostratis sessilibus; stylo longissimo bipartito; stigmatibus filiformibus; foliis lanceolatis integris vel minutissime glanduloso-serrulatis planis supra demum glabris subtus ferrugineo-sericeis.

Hab. Sikkim, reg. temp., alt. 9000–14,500 ped. (*J. D. Hooker*).

Arbor haud excelsa videtur. Rami strictiusculi, cortice atro-piceo glabro obducti; ramuli cinerei parcissime puberuli. Folia juniora pollicaria, late lanceolata, utrinque hirsuta sed præsertim subtus lucide sericea, adulta 3–7 pollices longa, in medio pollice sublatiora basi et apice acuta, superne obscure viridia costa venisque parallelo-arcuatis impressa cinerea, ceterum glabra nitentia, subtus tomento adpresso cinereo-cupreo rufescentia, costa subelevata, margine aut integerrima aut serraturis minutis et sat remotis glanduligeris obscure denticulata; petiolus 2–3 lin. longus cinereo-pubescens. Stipulæ nullæ persistentes. Gemmæ parvæ hirsutæ. Amenta lateralia pedunculata; pedunculus foliis 3–5, ceteris duplo minoribus, basi subrotundis instructus. Amenta mascula erecto-patentia, fere bipollicaria, 2 lin. crassa, rachis incano-pilosa; squamæ cuneatæ, dorso glabræ nervosæ, staminibus duplo triplove breviores, fulvescentes; stamina gemina, filamentis ad medium dense hirsutis, fulvis; antheris rotundatis, aureis. Amenta feminea erecto-patentia, demum 4–6-pollicaria, laxiuscula, subdensiflora, acuta; squamæ spathulatæ, subcastaneæ, pilis griseis hirtæ, capsulæ dimidiam mediam inferiorem tegentes, demum ea quadruplo breviores; nectarium basin capsulæ attingens; capsula fusco-rufescens, conico-acutata, pilis brevibus adpressis primo sericea, demum calva; stylus piceus, valde elongatus (longitudine capsulæ), ad medium fissus; stigmata divaricata, brevissima, pallidiora.

Variare videtur foliis anguste lanceolatis utrinque attenuatis (fere ut in

S. viminali) et fol. ovalibus, basi subrotundatis (fere ut in *S. Smithiana*). Nulli formæ Salicis cujusdam europeæ similis, a *S. viminali* et affinibus longissime recedit annulis pedunculatis; a *S. phylicifolia* capsulis sessilibus; ab omnibus amentis femineis longissimis, capsulis acutatis, stylo eximio producto et bipartito, foliis subtus rufescenti-sericeis.

18. S. LONGIFLORA, *Wall.* (sec. specimen in herb. Hookeri). Amentis breve pedunculatis foliis 2–3 parvis suffultis gracillimis laxe pendulis densifloris; squamis fusco-testaceis obtusis glabris vel sparse pubescentibus; capsulis sessilibus crasse ovatis acutis glaberrimis; stylo brevi; stigmatibus partitis erectis; foliis anguste lanceolatis acutis integerrimis subtus pallidioribus nonnunquam tenuiter sericeis.

Hab. in India orientali (*Wallich*); Sikkim reg. temp., alt. 9000 ped. leg. *J. D. Hooker.*

Arbuscula 10-pedalis, ramosa; ramuli breves, fere rectangulariter divaricati, glabri, cortice fusco-nigricante obducti. Gemmæ parvæ, vix lineam longæ, adpressæ; sæpius pallescentes. Folia alterna, patentia, petiolata, adulta 1½ vel 2½ pollices longa, semiunciam et plus lata, exacte lanceolata, basi et apice angustata, margine omnino integerrima, utrinque glaberrima, supra obscure viridia, costa lucida et parce pilosa percursa; subtus juniora glaucescentia, costa et nervis fuscioribus lineata, adulta opaca et dilutiora; petiolus 2 lin. longus, parce pilosus, in foliis novellis multo brevior. Amenta lateralia, patenti-pendula, adulta 2–4-pollicaria, 2 lin. crassa, valde densiflora, subflexuosa, exacte cylindrica, apice acutiuscula; pedunculus semipollicem longus, foliis 2–4 suboblongis vix pollicaribus subtus glaucescentibus vestitus. Rachis ob capsulas condensatas scrobiculata, brevius hirta; squamæ semilinea longiores, subspathulatæ, brunneo-testaceæ apice subfusciores, dorso glabriusculæ vel parce puberulæ, basin capsulæ vix attingentes; nectarium minutum; capsula ex ovata et crassa basi brevissime conica, ¾ lin. longa, fere omnino sessilis, glabra, viridi-brunnescens; stylus obsoletus apice bifidus; stigmata bipartita, laciniis divaricatis.

19. S. CAPREA, *L. Sp.* 1448. Folia tantum vidi, ad hanc speciem forsitan referenda. *Ands. l. c.* p. 476. n. 7.

20. S. JULACEA, *Ands. l. c.* p. 476. n. 8. Amentis sessilibus longissimis attenuatis squamis glabrescentibus; capsulis ovato-linearibus vix pubescentibus, pedicello nectarium ter quaterve superante, stylo nullo, stigmatibus erectis; foliis oblongis obtusiusculis subtus argenteo-pilosis; gemmis ramisque glabris.

Hab. In sylvis excelsis supra Hyderabad, alt. 2600–2730 metr. (*Jacquemont*).

Descriptionem in Act. Holm. *l. c.* vide.

21. S. WALLICHIANA, *Ands. l. c.* p. 477. n. 9. Amentis sessilibus attenuatis erectis, fem. densifloris, masc. arcuatis; squamis basi hir-

sutis; capsulis conicis elongatis cano-villosis; pedicello nectarium minutum bis superante; stylo nullo, stigmatibus erectis; foliis oblongis abrupte acuminatis glabris coriaceis; gemmis glabriusculis; ramulis pulverulis.

Salix grisea, *Wall. Catalog.* n. 3700.

Hab. In Nepalia, Kamaon, Silhet (*Wallich*), Kalimath (*Strachey et Winterbottom*), Himalaya bor.-occ., regio temp. alt. 6000–9000 ped. (*Thomson*).

Descriptionem in Act. Holm. *l. c.* vide.

22. S. HASTATA, *L.*, sp. 1443; *Ands. l. c.* p. 479. n. 10.

Specimina, quæ, a Jacquemont reportata, in herb. Parisiensi vidi, ab europæis nullo modo differunt, duabus formis ludentia: 1. *rotundifolia*: foliis rigidis, acute serratis, cortice ramorum fusco-roseo; 2. *oblongifolia*: foliis tenuioribus, fruticulus minimus. Quæ tamen in herb. Hookeriano (Tibet, reg. alp., alt. 11,000–15,000 ped.) examinavi, a nostris in eo recedunt, quod amenta multo præcociora videntur, aut omnino sessilia, aut bracteis paucis parum evolutis suffulta.

23. S. ELEGANS, *Wall. l. c.* n. 3699. Amentis pedunculatis, masc. brevibus obtusis erectis, fem. gracillimis laxe subpendulis acutis; squamis parvis pallide flavis apice glabris, nectario pedicellum capsulæ subæquante; capsula brevissime pedicellata conica glaberrima; stigmatibus sessilibus bipartitis; foliis (obovato-) lanceolatis serrulatis subtus intense glaucis demum rigidis utrinque glaberrimis.

S. Kamanensis, *Lindl. Wall. l. c.* n. 3701; S. denticulata, *Ands., l. c.* p. 481. n. 12.

Hab. In India superiori alpestri in regionibus Himalensibus ad Baltal (*Jacquemont*); in Kamaon (*R. Blinkworth*); Himalaya boreal.-occid.; reg. temp. 6000–9000 ped. (*Thomson*); Niti, Garhwal, 11,500 ped. (*Strachey et Winterbottom*).

Descriptionem in Act. Holm. *l. c.* vide.

Species nitidissima alpestris, ob folia et habitum totum necnon amentorum et capsularum forma inter *S. phylicæfoliam* et *S. hastulatam* quodammodo media, posteriori autem sine ullo dubio proxima.

**S. himalensis*, Klotzsch (herb. Berolin.). Magnitudine altiori, foliis majoribus magis elongatis apicem versus attenuatis exacte lanceolatis margine acutius dentatis basi æqualiter angustatis subtus evidentius cæsiis.—*S. Govaniana*, Wall. Cat. n. 3699.

Hab. In Nepalia (*Wallich*); Sirmore (*Govan et Kamrup*); in alpibus Himalensibus (*Hofmeister*).

24. S. MYRTILLACEA, *Ands.* Amentis sessilibus crassiusculis curvatis densifloris; squamis acutatis nigricantibus basi pilosiusculis; capsulis conicis puberulis subsessilibus, stylo producto, stigmatibus indivisis; foliis rigidiusculis ellipticis integerrimis glaberrimis subtus opacis venulosis.

Hab. Sikkim, reg. alp., alt. 12,000 ped. (*J. D. Hooker*).

Frutex mediocris altitudinis. Rami sat robusti, ramosi, toruloso-angulati, cortice fusco-castaneo vel cinereo nigrescente glaberrimo nitente obducti. Folia dense conferta, petiolo glabro lutescente vix lineam longo brevissime petiolata, pollicaria, semipollicem lata, supra medium frequenter latiora, basi subrotunda vel rarius subangustata, apice acutiuscula, margine acuto subrevoluto integerrima, utrinque pure at subtus dilutius virescentia, lucida, plana, venis et præsertim costa fulvescenti subtus elevatis pulchre striata, juniora subpellucido-rufescentia, adulta membranaceo-rigida. Amenta (mascula non vidi) præcocia, omnino sessilia, nullis foliis evolutis suffulta, pollicem longa, curvata; squamæ ovatæ, acutæ, fusco-nigricantes, pilis sat longis basi obsita, capsulam basi amplectentes et eam dimidiam apice acutæ æquantes; capsulæ testaceo-fuscæ, pubescentia brevi subsericeæ, ex ovata basi conico-angustatæ, lineam longæ, stylo sat evidente rostratæ.

Habitu fruticis, forma, consistentia, nervatione, glabritie et colore foliorum *Salici myrtilloidi* omnino est similis, ut forsan ab ea vix tute distinguenda. Differt autem: amentis (quæ tamen non nisi jam deflorata vidi) certe sessilibus, foliis nullis bracteatis, capsulis brevioribus etiam sessilibus, stylo denique evidenter producto.

25. S. SCLEROPHYLLA, *Ands.* Amentis sessilibus nudis e gemmis maximis erumpentibus; stam. 2 liberis; squamis ovatis concoloribus seu apice subinfuscatis margine pilosis; capsulis sessilibus conicis rostratis sericeo-puberulis cinerascentibus, nectario ventrem capsulæ tegente, stylo obsoleto fusco, stigmatibus erectis; foliis ovalibus basi rotundatis integerrimis coriaceis planis.

Hab. Laptak Tibetiæ (*Strachey et Winterbottom*) et Dras Himalayæ, alt. 10,000–15,000 ped. (*Thomson*).

Frutex ut videtur humilis. Rami divisi et divaricati, crassiusculi, torulosi, cortice fusco sæpius glauco-irrorato obducti. Gemmæ intrafoliares ovato-conicæ, apice subincurvo productæ, intus planæ, extus trigono-teretiusculæ, basi fuscescentes sæpe irrorato-glaucæ, apice testaceo-pallidiores, petiolum sæpissime superantes; gemmæ florales sat magnæ, perulis castaneo-nitentibus diu persistentibus inclusæ. Folia juniora exacte elliptica utrinque adpressa, sericea, integerrima et glabra, subtus pallidiora, adulta pollice fere longiora, $\frac{3}{4}$ poll. lata, rotundato-ovalia, basi late rotundata immo obsolete subcordata, apice vix producta, venis arcuatis valde distinctis venulosa, pure viridia, subtus pallidiora, coriaceo-dura, plana, utrinque glabra, margine omnino integerrimo interdum subrevoluta; petiolus vix lineam longus basi in gemmæ latitudinem dilatatus. Amenta sessilia nudiuscula vel bracteis minutis suffulta, brevia (vix semipollicem longa et 2 lin. crassa), ovali-oblonga, obtusa; amenta mascula arrecta, ramo adpressa; squamæ ovato-subrotundatæ, pallidæ apice subinfuscatæ, superne tenuissime et breviter pilosiusculæ, venis obscurioribus percursæ; stamina gemina libera, filamentis glabris luteis squamam triplo superantibus, antheris rotundatis fulvescentibus. Amenta feminea hori-

zontaliter excurvata vel recurvata; squamæ ut in amentis masculis, sed apice evidentius ciliatæ; capsulæ sessiles, ovato-conicæ, pube cinerea inferne rariori puberulæ; nectarium crassum truncatum; stylus brevis sed evidens, fuscus; stigmata brevissima, erecta, etiam fusca.

Hæc species nostræ *S. repenti* admodum similis eique sine ullo dubio proxime analoga; a qua tamen bene differt: ramis glauco-irroratis, foliis margine parum revoluto exsiccatione nullo modo nigrescentibus sed planioribus, amentis et capsulis *omnino* sessilibus, stylo vix producto. Ramis et gemmis magnis conicis subincurvis affinitatem cum *S. daphnoide* præbet sat magnam; folia et amenta tamen recedunt.

26. S. MYRICÆFOLIA, *Ands. l. c.* p. 483, no. 13. Amentis sessilibus brevibus crassis densifloris subbracteatis; squamis obovato-spathulatis barbatis; nectario brevissimo; capsula sessili ovato-conica albo-sericea; stylo nullo; stigmatibus erectis; foliis lingulato-oblongis integerrimis coriaceis opacis subtus pallidioribus.

Hab. In India superiori orientali (*Jacquemont et Perrottet*).

Descriptionem in Act. Holm. *l. c.* vide.

Est e tribu *S. repentis, Salici sibiricæ* etiam quodammodo similis, sed foliis opace cinerascentibus, amentis brevissimis et horizontaliter patentibus, squamis exacte spathulatis apice subtruncatis necnon capsulis sessilibus alto-tomentosis stylo producto destitutis, bene distincta. Folia nunc latiora et subovalia, nunc angustiora et plus minus lanceolata, incana vel glabrescentia variant; semper autem rigida, opaca, et subtus pallidiora.

27. S. FRUTICULOSA, *Ands.* Amentis lateralibus subsessilibus bracteis nullis aut parvis et perulis magnis suffultis ovalibus densifloris; squamis rotundato-obovatis infuscatis glabris; capsulis sessilibus ovatis subrostratis dense cinereo-villosis, nectario basin capsulæ tegente, stylo obsoleto, stigmatibus erectis; foliis anguste lanceolatis glaberrimis integris, subtus glaucis.

Hab. Pindari, Kumaon (*Strachey et Winterbottom*); Janshar, reg. alp., alt. 15,000 ped. (*Thomson*).

Fruticulus parvus fere semipedalis vel ultra; rami validi, intricati, torulosi, cortice glabro fusco-nitente vel testaceo interdum glaucescente obducti. Gemmæ sub margine conicæ castaneæ, adpressæ, obtusiusculæ. Folia vix unciam longa, $1\frac{1}{2}$–3 lineas lata, basi et apice æqualiter attenuata, margine omnino integerrima, subrevoluta, supra læte viridia, subtus pallide glaucescentia. Amenta mascula pedunculo brevissimo laterali foliis minutis instructo insidentia, vix semipollicem longa, rachis hirsuta, squamæ obovato-spathulatæ, filamenta gemina libera, obscurius flava, glabra, squamam triplo superantia, antheræ sat magnæ demum fuscæ. Amenta feminea lateralia, vix pedunculata, foliis perpaucis minimis suffulta, brevissima (2 lin. longa) ovato-ovalia; rachis puberula; squamæ rotundatæ, apice subinfuscatæ ceterum flavescentes, capsulam ad mediam involventes; capsula sessilis, anguste conica

dense sericea, cinerascens, nectario basin superante; stylus vix conspicuus; stigmata brevissima, erecta, nigricantia.

Est frutex parvus inter *S. hastifoliam* nostram et *S. arbusculam* forsan medius. Differt autem foliis minutis integerrimis subtus glaucis, capsulis sessilibus et stylo nullo conspicuus.

28. S. FLABELLARIS, *Ands. l. c.* p. 497, n. 24. Amentis ex apice ramorum annotinorum, fem. subdensifloris; squamis obovato-rotundatis glaberrimis; nectario basin capsulæ superante; capsula subsessili ovato-conica glaberrima; stylo mediocri, stigmatibus bipartitis; foliis obovato-rotundatis vel lingulatis glabris crenatis subtus pallide viridibus; trunco procumbente, ramis flabelliformibus.

S. lucida, Jacquemont, n. 1600. *S. obovata*, Wall., n. 3698.

S. rotundifolia, Royle, Klotzsch. herb. berol.

Hab. In humidis herbosis sub jugis versus Soogrum, alt. 4000 metr. (*Jacquemont*); and Kamaon (*Wallich*). In alpibus Himalensibus (*W. Hofmeister*); Kunawur, reg. alp., alt. 15,000 ped. (*Thomson*).

Descriptionem in Act. Holm. *l. c.* vide.

Modus crescendi omnino ut in *S. retusa*, sed consistentia foliorum fere ut in *S. hastata*, amenta iis *S. hastatæ hyperboreæ* Fr. non parum similia. Cæterum, ut facile omnes species hujus generis vere alpinæ, admodum variat.

Foliis (1) *subrotundis*, basi dilatatis, apice rotundatis.—Hæc *S. herbaceæ* non dissimilis.

(2) *obovatis*, basi eximie angustatis, apice dilatatis et sæpe emarginatis.—Hæc forma speciei est typica, modificationes maximas *retusæ* æmulans.

(3) *spathulatis*, basi sensim angustatis, apice producto, acutiusculo angustis.—Hæc formis maxime alpinis et parvis *S. hastatæ* analoga.

Amentis (1) *brevibus* crassis; in formis minimis.

(2) *longis* subrarifloris; in formis maxime elatis.

29. S. THOMSONIANA, *Ands.* Amentis in ramulis elongatis annotinis terminalibus elongatis cylindricis, masculis laxifloris, femineis subdensifloris; squamis obovato-rotundatis hirsutis; nectario producto fere ad mediam capsulam attingente; capsula subglobosa albo-villosa; stylo producto, stigmatibus crassis integris divaricatis; foliis lanceolatis subtus incano-villosis nervis albo-lineatis tenuiter et remote serrulatis.—*S. vagans*, Hook. f. (herb. Ind. orient.).

Hab. Sikkim, reg. temp., alt. 10,000 ped. (*Hooker et Thomson*).

Fruticulus subpedalis, trunco sat valido repente, ramis adscendentibus torulosis, cortice fusco nitente obductis. Folia lanceolata, utrinque attenuata, plana, margine tenuissime revoluta, remote serrulata, supra obscure viridia et glabra, subtus incano-hirta, secundum nervos arcuatos sericea. Amenta sat longa; masc. usque ad 2 pollices producta, laxe patentia, flexuosa, remotiflora; squamæ atræ, densissime cinereo-

hirsutæ; stamina et antheræ minutæ, fuscescentes. Amenta feminea breviora, angusta, magisque densiflora saltem parte superiore; squamæ atro-fuscæ rotundatæ capsulam mediam superantes, convexæ, pilis raris conspersæ; nectarium angustum, subcapitatum, squama parum brevius, ventrem capsulæ superans; capsula globosa, omnino sessilis, pube cinerea tomentosa; stylus rectus, semilineam longus, ater; stigmata stylo tertia parte breviora, indivisa, rectangulariter divaricata.

Habitu amentorum et forma capsularum solæ *S. reticulatæ* similis, foliis autem *S. arbusculæ* proxima.

30. S. CALYCULATA, *Hook. fil.* herb. Ind. orient. Amentis terminalibus sessilibus oblongis, masc. diandris; capsulis breviter pedicellatis ovatis glabris, stylo mediocri, stigmatibus brevibus; foliis obovatis crenulato-dentatis petiolatis subtus pallidioribus junioribus villosis, venis supra impressis.

Hab. Sikkim, reg. alpina, 14,000–15,000 ped. alt. (*J. D. Hooker*).

Fruticulus parvus, ad summum semipedalis, adscendens; truncus penna passerina crassior, cortice fusco rugoso obductus, inferiore parte radicans; rami arrecti, subfastigiati, apice ramulosi, foliati et cortice pallidiori obducti. Stipulæ nullæ conspicuæ. Gemmæ mediocres fusco-rufescentes, ovales, glabræ, adpressæ. Folia plerumque vix pollicem longa, 3–7 lin. lata, supra medium dilatata, subrotunda, ibique serraturis subdepressis, apice minoribus crenata, juniora utrinque, præsertim autem subtus et secus costam, pilis argenteis adpressis subvillosa, demum omnino glabra; supra obscure viridia, venis impressis subangulosa, subtus pallidiora non autem glaucescentia venis obscurioribus prominulis venulosa; petiolus ½–lin. longus. Amenta mascula ovali-rotundata, foliis fulcrantibus subocculta; squamæ ligulato-obovatæ, fuscæ, glabræ, staminibus 2 triplo breviores; filamenta glabra, libera, demum subpicea, antheræ ovales exsiccatione fuscescentes. Amenta feminea etiam terminalia, sub-rotunda; squamæ ut in amentis masculis; capsulæ ex ovata basi conicæ, glaberrimæ, piceæ, pedicello nectarium glaberrimum subduplo superante.

Monstrositas in herbario adest, staminibus sc. in tubum, capsulæ apertæ instar, supra crassiorem ibique bifidum concretis, laciniis ovatis acutis intus subantheriferis, basi squama ampliata velatis.

Proxima est sine dubio speciei sequenti, sed differt: trunco multo humiliori nec flabellatim repente, ramis divaricatis nec unilateraliter erectis, foliis duplo latioribus aut integris aut obsolete crenulatis, squamis capsularum elongato-spathulatis glabris cum capsulis distinctius pedicellatis rufo-piceis.

31. S. SERPYLLUM, *Ands.* Amentis in ramulis annotinis terminalibus longius et distincte pedunculatis, masc. diandris; capsulis sessilibus glabris squamas involucrales apice superantibus, stylo elongato filiformi apice bipartito, stigmatibus bifidis laciniis brevissimis excurvis; foliis parvis ligulato-lanceolatis planis apicem versus utrinque 3-den-

tatis ceterum integerrimis breviter petiolatis subtus pallidioribus; trunco repente, ramis arrectis foliosis.—*S. longipes, Hook. fil.* (herb. Ind. orient.).

Hab. Sikkim, reg. subalp., alt. 10,000–17,000 ped. (*J. D. Hooker*).

Est fruticulus humilis, procumbens, radicanti-repens, pedalis, trunco pennam anserinam crasso, ramis simplicibus arrectis foliatis apice floriferis puberulis, 2–4 uncias longis. Stipulæ nullæ persistentes. Folia in ramulis quasi distiche condensata, circiter 3 lin. longa, supra medium linea sublatiora, lingulato-lanceolata, basin versus attenuata, apice argute denticulata, plana, glaberrima, subtus subglaucescenti-pallidiora venisque lineata, supra dense viridia costa impressa; petiolus semilineam longus, gracilis. Gemmæ, e quibus rami erumpunt, perulis luteis glabris obtectæ. Amenta terminalia, pollicaria, subclavata, densiflora, erecta. Amenta mascula: rachis aureo-pilosa; squamæ rotundato-obovatæ, intus et margine pilosæ, dorso nigricantes, staminibus triplo breviores; filamenta tenuissima, basi (ubi a squama teguntur) dense pilosa, ceterum glabra obscure fusca; antheræ minutæ oblongæ, exsiccatione flavo-virescentes. Amenta feminea primo semipollicaria et claviformia, demum cylindrica, 1¼ poll. longa; rachis hirsuta; squamæ obovato-cuneatæ fuscæ, pilis crispatis cinereis ubique pilosæ, demum denudatæ, sub florescentia germina fere tota obtegentes, deinde capsulis fere duplo breviores; capsula conica, attenuato-apiculata, omnino sessilis, glabra, fusco-brunnea; nectarium basin capsulæ superans; stylus filiformis, capsula vix duplo brevior, fusco-castaneus, fere ad medium bipartitus, laciniis erectis filiformibus; stigmata brevissima, pallidiora, bifida, divaricata.

Distinctissima est species, crescendi modo (fere ut in thymo serpyllo) ramis et foliis ab omnibus diversa. Quod ad formam amentorum eorumque partium attinet proxima est *S. myrsinites*, quæ tamen abunde differt.

32. S. Lindleyana, *Wallich, l. c.* no. 13,697. Amentis in apice ramulorum annotinorum brevibus ovato-rotundatis; squamis ovatis glaberrimis capsula duplo brevioribus; capsula breviter pedicellata conica glaberrima; stylo producto, stigmatibus incrassatis; foliis ovali-lanceolatis crenulatis glaberrimis subtus pallidioribus.—*Ands. l. c.* p. 199, no. 25.

Hab. In India superiori, ad Gossain Than, ad Kumaon (*Blinkworth, sec. Wallich*), Sikkim, reg. alp., alt. 16,000 ped. (*J. D. Hooker*), et Barje Kung pass, Kumaon, 17,000 ped. alt. (*Strachey et Winterbottom*, 17).

(1) *latifolia*: foliis condensatis, 3–4 lin. longis, 1–2 lin. latis, apicem versus subserrulatis.

(2) *microphylla*: foliis valde condensatis, 2–3 lin. longis, lineam latis, costa impressa profunde canaliculatis, margine revolutis. Fruticulus habitum *Azaleæ procumbentis* non male referens.

Descriptionem in Act. Holm. *l. c.* vide.

33. S. OREOPHILA, *Hook. fil.* (*Herb. Ind. Orient.*). Amentis sessilibus foliis subobtectis minimis paucifloris; masc. diandris; capsulis subsessilibus glabris squamas lingulatas glabras triplo superantibus, stylo brevi, stigmatibus brevissimis integris; foliis oblongo-cuneatis vel obovatis apice argute dentatis ceterum integris breviter petiolatis utrinque concoloribus glaberrimis venis supra impressis.

Hab. In Sikkim, reg. alp., alt. 15,000–16,000 ped. (*J. D. Hooker*).

Fruticulus semipedalis vel minor, trunco pennam passerinam crasso ramoso atro-fusco; ramis arcuatis, ramulosis, flabellatim repentibus cum ramulis dense foliatis. *Gemmæ glabræ rufescentes. Stipulæ* nullæ conspicuæ. Folia 2½–3 lin. longa, 1½ lin. lata, obovata v. oblongo-cuneata basi angustata apice acuta ibique serraturis 3–5 profundis subfissa, ceterum omnino integerrima, venis supra impressis subtus prominentibus rugulosa, petiolo perbrevi insidentia, læte viridia, subtus vix pallidiora, utrinque glaberrima pilis paucis ad basin petioli nonnunquam hirta. Amenta in ramulis ultimis terminalia, omnino sessilia et foliis summis obtecta, 2–5 flora. Am. mascula: rachis tenuissime puberula; squama lingulata, acutiuscula, vix lineam longa, testaceo-rufescens, glabra vel pilis brevissimis et rarissimis nonnunquam conspersa venisque obscurioribus lineata; filamenta gemina libera squamam duplo superantia eique concolora, glabra; antheræ etiam pallide brunnescentes, parvæ, globosæ. Amenta feminea vix 3 lineas longa, e floribus quasi umbellatim confertis 3–7 constantia; squama spathulato-lingulata, pallide fusca, glaberrima, venulosa, basin capsulæ superans; nectarium ovatum acutiusculum ventrem capsulæ attingens; capsula basi quasi in pedicellum brevissimum constricta, deinde incrassata et itaque ex ovata basi conica, 1½ lin. longa, obtusiuscula, castanea, lucens, glaberrima; stylus vix ¼ lin. longus tenuis; stigmata eadem longitudine excurvata, quam capsula fusciora; lana seminum nivea.

A *S. Lindleyana*, quacum habitu maxime congruit, aperte differt foliis apice profunde serratis, planis. *S. retusam serpyllifoliam* non male habitu refert.

34. S. SECTA, *Hook.* fil. Amentis terminalibus eximie paucifloris foliis conditis, masc. diandris, squamis acutiusculis glaberrimis testaceo-rufescentibus; capsulis sessilibus glaberrimis squama rotundata ad medium involutis, stylo subnullo, stigmatibus brevissimis; foliis cuneatis apice 3–5-fidis glabris; fruticulus omnium minimus.

Hab. Sikkim, alt. 17,000 ped. reg. alp. (*J. D. Hooker*).

Est quantum novi omnium *Salicum* maxime pygmæa, e trunco hypogæo ramos vix pollicares undique divaricatos valde intricatos et dense foliatos, ut folia rosulata *Androsaces* vel *Drabæ* cujusdam, cæspites densos et minimos formans. Folia vix linea longiora, apice fere eadem latitudine ibique ad tertiam partem laminæ laciniis porrectis acutis secta, utrinque viridia, subcoriacea, plana, impresse venulosa.

Amenta terminalia foliis arcte abscondita, e floribus 2–4 constantia; mascula subrariflora, squamis apice subpallidioribus integris aut subdivisis filamentis geminis liberis pallidis et glabris duplo brevioribus, antheris rotundatis sat magnis, fuscioribus; feminea ovato-ovalia e capsulis 4–6 composita, in apice ramulorum capituliformi sessilia et foliis occultata; capsulæ lineam longæ, exacte conicæ, glaberrimæ, testaceo-rufescentes, dorso squama rotundata glaberrima apice infuscata involutæ, nectario capitato glabro ventrem capsulæ superante; stylus vix conspicuus; stigmata minima, divaricata.

S. oreophila et *S. secta* inter se eodem modo affines sunt ut *S. Brayi* et *S. berberifolia*; bene autem distinguuntur non tantum habitu toto fruticuli sed etiam foliis et amentis.

On Leopoldinia Piassaba, *Wallace*. By RICHARD SPRUCE, Esq. Communicated by GEORGE BENTHAM, Esq., V.P.L.S.

[Read June 16th, 1859.]

As the palm producing the Piassaba of the Rio Negro—better known as that of Pará, from which port it is exported in vast quantities to Europe and N. America—has been supposed, for want of sufficient data, identical with the *Attalea funifera* of Martius, which furnishes the Piassaba of Bahia, I am desirous of laying before the Linnean Society a description of the former, which has been correctly referred by Mr. Wallace to the genus *Leopoldinia*. In proof of this assertion, I need cite only the most prominent characters: thus, in *L. Piassaba* Wallace, *the male flowers have six monadelphous stamens, and the fruit is a berry with a sarcocarp composed of thick interlacing fibres*, as in the *Leopoldiniæ* described by Martius; whereas in the genus *Attalea, the male flowers have from ten to twenty-four free stamens; and the fruit is a drupe, with a stony putamen.* The fruits of the Piassaba have the peculiar dull blood-colour, the compresso-globose form (though less compressed than in *L. minor*), and the gibbosity at the base (like that of the fruits of some *Sapindi*) which characterize all the species of *Leopoldinia* known to me*. The long beard of the petioles, extending to the very ground, except in the tallest specimens, where the lower part decays and falls away, and the crown

* The fruits of the *Leopoldinia* are called "flavo-virentes" by Martius, who, it is plain, had not seen them fully ripe.

of long widely-arched fronds, with the lower part of the rachis destitute of pinnæ for a length of nearly 5 feet, give to the Piassaba an aspect *sui generis*, and render it one of the most striking and handsome of the noble family of palms. This beard is the membrane which envelopes the frond in its folded-up state, and which in most palms falls away entirely when the frond expands, or remains attached in fragments to the margin and apex of the pinnæ. The other species of *Leopoldinia* have the stem "fibrillitio reticulato circumtextus"—sheathed with the persistent petiole-bases, which do not terminate in a pendulous beard, as in *L. Piassaba*. In tall specimens this net-work falls away, especially in *L. major*, Wallace*.

It is plain in all *Leopoldiniæ* that the sarcocarp of the fruit corresponds to the sheathing base of the petiole, as it consists of the same interlacing woody or horny fibres, only on a smaller scale and more compact. The sarcocarp of *L. Piassaba* differs from that of the other species of *Leopoldinia* in having several inner layers of slender brown interlaced fibres, which correspond to the beard of the petiole.

As Martius had not seen his *Leopoldiniæ* in all stages of their growth, the delicate fugacious spathes escaped his notice, and he describes the genus as spatheless, which would be an anomaly among palms. In reality, all the species have two very thin fusiform brown spathes, which fall away at an early stage, long before the flowers are fully formed. I have good specimens of those of *L. minor*, Mart.

The ascertained distribution of the Piassaba palm is from the river Padauirí (a large tributary of the Rio Negro, entering on the left bank) on the south, to the cataracts of the Orinoco on the north; and from near the Japurá on the west, to the sources of the Pacimoni on the east. Its place of growth is in low sandy flats, where the water stands to a slight depth in rainy weather, but it avoids the swamps and the gapós in which the Mauritias and Euterpes delight. It is mostly found far away from the banks of the rivers; and I have seen but a single plant in such a locality, namely, just within the lower mouth of the Casiquiare,

* *L. major* is a many-stemmed palm—I have counted as many as twenty-four stems from one root; and by this character alone it may be distinguished from the other species of the genus, all of which have solitary stems. Seedling plants often form wide strips on the edge of sandy islands of the Rio Negro. In this state I have mistaken them, at a distance, for a species of *Pariana*—a genus of grasses well known to have considerable affinity to the palms.

on the right bank, on a barranca beyond the reach of floods. This was a noble specimen—perhaps over 40 feet high. My friend Wallace had been wrongly informed of the partiality of the Piassaba for black waters, as it grows more abundantly than anywhere else in the forests of the Casiquiare, and especially from the mouth of Lake Vasiva upwards, where the waters of the river are much whiter than below; but, as I have nowhere seen it on ground inundated by the rivers, it is plain that the colour of their waters cannot influence its existence. Near two Indian villages on this part of the Casiquiare, where I penetrated deep into the forest, I came on large groves of Piassaba. Nothing that I have seen in Amazonian forests dwells more strongly and pleasantly on my memory than my walk among these strange bearded columns, from whose apex sprang the green interlacing arches which shaded me overhead. The ground was dry—herbaceous vegetation there was none—and almost the only companions of the palm were scattered low trees of *Heterostemon simplicifolium* Spruce, with its large blue butterfly-like flowers, and another sort of tree of equally humble growth, clad with numerous flesh-coloured flowers, which Mr. Bentham is disposed to consider a new genus of *Flacourtiaceæ*. To have escaped from the cloud of mosquitos on the bank of the river no doubt enhanced the enjoyment. This was on the south side of the Casiquiare, but the Piassaba is equally abundant north of that river, and throughout the broad plain included by the Casiquiare, Orinoco, and Guainia. North of the Orinoco, on the Cunucunúma, Ventuári, and Sipápo, it is apparently much scarcer.

Of the Piassaba collected on the Casiquiare and Guainia, about half is taken down to Pará, and the other half to Angostura, on the Orinoco. In the summer season the Indian villages on those rivers present a very lively appearance, from the boat-building and rope-making which occupy their inhabitants. An interesting circumstance respecting the latter branch of industry came to my knowledge at San Carlos del Rio Negro, where, constantly hearing an old Indian woman spoken of as 'La Inglesa,' I sought her out, and found that she had been the lawful wife of an Englishman—a soldier in the Royalist army, who, when the Republican party triumphed, retired towards the frontier of Brazil, and squatted down at San Carlos. I was assured by his widow, and by others of the inhabitants, that this man, whom they knew only by the name of 'Don Juan,' first taught the people to make Piassaba-rope by the aid of a wheel, and in fact established the first rope-walk in

the Canton del Rio Negro. Whether this were true, or whether the Portuguese at an earlier date extended this branch of industry beyond the limits of their own territory, it is certain that, in so much as I have yet seen of the Peruvian and Quitenian Andes, rope of every kind, whether of Agave, Yucca, or palm fibre, or of cotton, is made purely by hand.

To Mr. Wallace's interesting account of the mode of collecting the Piassaba-fibre I have nothing to add, save that, as in the young plants, from which it is solely obtained, the beard is not always completely separated into fibres, but hangs down in riband-like strips, it is necessary before cutting it off to comb it out by means of a rude comb of two or three pointed sticks or long palm-prickles.

Besides the use which is made of the beard of the Piassaba, the pulpy envelope of the sarcocarp in the ripe fruit is said to yield the most delicious of all palm drinks, bearing great resemblance to cream both in colour and taste. I have not had the good fortune to taste it, or even to see the ripe fruit, which comes into season at midsummer, but, like the fruit of most other trees, is subject to seasons or periods of intermittence, when little or no fruit is matured. In 1853, the fruits all fell off when green. In the summer of 1854, I was prostrated by remittent fever at San Fernando de Atabapo. In the month of October of the same year I made an excursion of three days from San Carlos into the forest at the back of Solano, on the Casiquiare, with the express object of gathering flowers of the Piassaba, for which I was exactly in the season; but, singularly enough, on four trees I caused to be cut down there were only male flowers; and the heavy rain, with the sloppy state of the forest, compelled me to desist from further search. In the following November, a few days previous to my final departure from Venezuela, I visited another locality for the palm, on the Guainia, where I collected the fruit, which was almost fully formed externally, though the nucleus was still in a liquid state. In this place nearly all the Piassabas seen were monoicous. It seems, therefore, that the fruit takes from October to June (both inclusive), or nine months, to ripen. Some palms require a whole year, so that I have not seldom gathered ripe fruit and flowers on the same tree.

The other species of Leopoldinia have a thickish fleshy rind to the fruit, but it is so bitter as not to be eatable.

Another bearded palm is known to me, which has a consider-

able range of distribution in latitude, and apparently a very limited one in longitude, extending all along the eastern roots of the Andes, from a good way up the Huallaga, on the south, to the sources of the Bombonasa, and how much further northward I know not; but I have myself seen it through nearly six degrees of latitude. It is particularly abundant on low alluvial ridges strewed with pebbles of auriferous quartz near Paca-yacu, on the Bombonasa, and near Chapaja, on the Huallaga; but it nowhere descends into the Amazonian plain, nor have I seen it higher among the hills than about 2000 feet. This palm is a true *Attalea*, which I suppose distinct from *A. funifera* Mart., because the fruit is of a different form, and because Martius assigns a submaritime habitat to his palm. It is known to the inhabitants of Maynas by the name of '*Biróti-huási*' (*Biróti*, the darts used in shooting with the blowing-cane, and *huási*, a habitation), because they make their Biroti of strips of the petiole. The beard is deciduous —not persistent, as in the Piassaba—shorter, far less copious, and apparently less durable. It makes, however, excellent brooms, which is the only use I have seen it turned to. In the Quitenian Andes a very similar broom is made of the base of the petiole of the Cádi palm (*Phytelephas macrocarpa*); but the decayed parenchyma requires to be combed away from the fibres ere they can be well put to this use.

I proceed to give the dimensions of a Piassaba palm which I cut down in the forests of the Guainia, in November 1854; followed by a detailed description of the same species, drawn up from fresh specimens.

Caudex, 40 ft. Fronds, 15½–16½ ft. (including petiole of 4 ft. 8 inches). Pinnæ, 63 pairs. Beard, 21 inches long (but on young plants growing close by as much as 4 feet 9 inches long). Spadix, 4 ft.; stipes (to first branch), 15 inches, 10 lines broad, 4½ lines thick; remains of two spathes, 5 inches apart. Fruit (not ripe), 21 lines long, 18 lines broad, 15 lines thick.

Leopoldinia Piassaba, *Wallace, Palm Trees of the Amazon*, p. 17.

Piaçaba Brasiliensium. *Chiquichiqui** Orinocensium.

Hab. Per tractus sylvarum Amazoniensium a fluvio Padauirí ad Orinoci

* The name 'Chiquichiqui' originated on the Orinoco; but I am ignorant to what Indian language it belongs.

cataractas usque, in arenosis depressis quibus tempore pluvioso aquæ imbrium colliguntur, gregarie viget.

DESCR. *Caudex* solitarius, mediocris (15–40-pedalis), crassitudine eum *Iriartæ exorrhizæ* æquans, lævis, annulatus, barba petiolorum persistente omnino velatus, vel in stirpibus elatioribus, barba marcida delapsa, apice solo barbatus.

Frondes terminales, plurimæ contemporales, lato-arcuatæ, infimæ subpendulæ, pinnatæ. *Petiolus* elongatus, basi erectus concavo-convexus, margine in vaginam fibroso-reticulatam badiam demum in barbam pendulam dissolutam dilatatus, superne semiteres angulis acutis. *Pinnæ* sub 60-jugæ, horizontaliter patulæ apice subpendulæ, lineares acuminatæ.

Spadices 2 v. 3 contemporales monoici dioicive, arcuato-penduli, paniculati, 4-ies divisi, ambitu triangulari-acuminati, tomento pallido fulvo haud dense vestiti. *Stipes* a basi ad ramum infimum usque valde compressus et reliquiis spatharum duarum truncato-laceris instructus, superne polygonus. *Rami* angulares, basi plano-convexi, angulo recto v. subdivergente inserti; primarii sub 25, alterni, tres inferiores distichi prælongi 3-pinnati, superiores subito breviores polystichi; ramuli haud profunde foveolati, floriferi. *Bracteæ* minutæ, ad ramorum basin triangulares acuminatæ, ad ramulorum basin subulatæ acuminatæ.

Flores ♂ ochrei, odore *Resedæ odoratæ* scatentes, vel ad spadicem totum ejusdem diversæve stirpis, vel ad spadicis ramos superiores solos, ramis infimis flores ♀ gerentibus. *Calyx* uterque 3-sepalus; *sepala exteriora* oblata fimbriata tenuiuscula pellucida late imbricata; *interiora* duplo longiora late ovata obtusa cartilaginea valvata. *Stamina* 6, filamentis basi ipsa coalitis et ovarii rudimento stylos 3 rudimentarios gerenti adnatis.—*Flores* ♀ haud vidi.

Bacca drupæformis subcompresso-globosa, basi subgibba, monosperma. *Epicarpium* sordide sanguineum nitidum. *Sarcocarpium* crassum laminis plurimis constans; lamina exteriore e fibris crassis corneolignescentibus intertextis anastomosantibusque; laminis interioribus e fibris tenuibus intertextis. *Testa* tenuis membranacea badia separabilis. *Nucleus* in fructu juniori nondum formatus est.

Descriptions of some new species of *Musci* from New Zealand and other parts of the Southern Hemisphere, together with an enumeration of the species collected in Tasmania by William Archer, Esq.; arranged upon the plan proposed in the 'Musci Indiæ Orientalis.' By WILLIAM MITTEN, Esq., A.L.S.

[Read March 17th, 1859.]

I. ANDREÆACEÆ.

1. ANDREÆA, *Ehrh.*

A. subulata, *Harvey*.

Hab. Tasmania; Jackey's Plain Creek, on rocks; rivulet at the back of Cumming's Head, Western Mountains. *Mr. Archer*.

A. nitida, *Hook. fil. et Wils.*

Hab. Tasmania; on stones; rivulet near Cumming's Head, Western Mountains. *Mr. Archer*.

A. petrophila, *Ehrh.*

Hab. Tasmania; the Falls. *Mr. Archer*.

A. ACUMINATA (*Mitten*). *A. acutifoliæ* simillima, foliis e basi erecta caulem amplectente patulis apicibus incurvis explanatis ovato-lanceolatis margine partis erectæ minute crenulata dorso apicem versus inconspicue papillosis, cellulis ex apice ad medium minutis quadrato-rotundatis diametro circiter $\frac{1}{4000}$ unciæ metientibus deinde in oblongas subparallelogrammaticas parietes latitudine superantes inferne in longiores angustas fuscidulas parietibus crassioribus transeuntibus, perichætialibus ovalibus tenuiter acuminatis convolutis.

Hab. Tasmania; Cheshunt. *Mr. Archer*.

Very nearly allied to *A. acutifolia*, but with leaves a little wider, and cells in the upper portion smaller and more numerous, all with much narrower walls; those just below the middle of the leaf with walls narrower than their own width, and pellucid. From *A. petrophila* it recedes in the form of its leaves as well as in their cellular structure already described.

A. MONTANA (*Mitten*). *A. alpinæ* simillima, foliis parte superiore sensim acutis vix acuminatis margine integerrimis, margine partis inferioris minute crenulato, cellulis basi oblongis elongatisque parallelogrammaticis cito in minutas longitudine $\frac{1}{2000}$, latitudine $\frac{1}{4500}$ unciæ metientes transeuntibus.

Hab. On rocks; rivulet behind Cumming's Head, Western Mountains; Tasmania. *Mr. Archer*.

Closely resembling *A. alpina* in size, habit, colour of its leaves, and general appearance; but the outline of its leaves, when compressed, is ovate, slightly acuminate; the cells at the base distinctly parallelo-

grammatic, and those of the upper portion larger. *A. acutifolia* has much narrower leaves.

A. ASPERULA (*Mitten*). Gracillima, cæspitosa, ramosa, foliis patentibus ovato-lanceolatis acutis enerviis margine superiore dorsoque papillis asperrimis, cellulis superioribus longitudine $\frac{1}{3000}$ latitudine $\frac{1}{5000}$ unciæ metientibus, inferioribus in folii medio croceis oblongis paululum majoribus.

Hab. Australian Alps, *D. F. Müller*, No. 14, *ex parte*. Readily distinguished from all the allied species by the very papillose margin and back of its leaves.

II. DICRANACEÆ.

1. PLEURIDIUM, *Brid.*

P. GRACILENTUM (*Mitten*). Monoicum, habitu *P. alternifolii*, gracile, foliis inferioribus e basi ovali subulato-lanceolato-acuminatis, nervo subulam superiorem totam occupante, margine ad basin partis subulatæ indistincte crenulato vel lævi, cellulis inferioribus oblongis parallelogrammaticis superioribus minoribus, perichætialibus thecam non tegentibus patulis anguste ellipticis subulato longe attenuatis canaliculatis apice parce denticulatis integerrimisve laxe areolatis, theca in pedunculo brevi subglobosa leptodermi, operculo brevissimo, calyptra cucullata ad thecæ mediam descendente.

Hab. West side of Tower Hill, Tasmania; *Mr. Archer*. Also in King George's Sound, New Holland, *Menzies*.

Excepting that the perichætial leaves are less straight and bristly, in general appearance scarcely different from *P. alternifolium*, but its leaves are of a different form.

P. TENELLUM (*Mitten*). Monoicum, habitu staturaque *P. nitidi*, flore masculo gemmiformi minuto in foliorum caulinorum axillis, cellulis foliorum paululum brevioribus firmioribusque.

Hab. Tasmania, Cheshunt, *Mr. Archer*.

When dry, firmer than *P. nitidum*, with which it corresponds very closely, excepting in the male inflorescence, which has been observed on a single individual only. The substance of the leaves is firmer, and the whole plant pale brown. It appears to be distinct, but requires further examination in living specimens.

2. BRUCHIA, *Schw.*

(*Sporledera*, Hampe.)

B. MINUTA (*Mitten*). Monoica, perpusilla, brevicaulis, foliis patentibus lanceolatis angustatis, nervo percurrente, margine superne serrulato, cellulis laxiusculis, theca suborbiculari-ovata acuta collo sensim attenuato sessili erecta, calyptra apice rugulosa thecæ tertiam partem obtegente, flore masculo gemmiformi.

Hab. Tasmania, sides of ditches, Cheshunt, *Mr. Archer*.

Plants very minute, brownish, considerably smaller than *B. brevipes*. Leaves, when dry, appressed. In appearance, it resembles the smallest states of *Pleuridium nitidum*.

3. Leptotrichum, *Hampe*.

L. præaltum (*Mitten*). Dioicum, dense cæspitosum, robustum, caule elato subsimplici radiculis fuscis albidisve tomentoso, foliis patulis siccitate incurvis recurvisve subcrispatis e basi ovali sensim ad apicem angustatis lanceolatis concavis nervo lato sed tenui partem lanceolatam fere totam occupante, margine superne minute subserrulato, cellulis inferioribus oblongis ovoideis in rotundatas transeuntibus alaribus nullis, perichætialibus convolutis vaginatisque externis acuminatis internis subito in acumen setaceum contractis, theca in pedunculo elongato flavo cylindrica erecta, operculo subulato æquilongo subrecto, peristomio parvo dentibus rubris dimidio superiore irregulari modo bi- trifidis annulo angusto, flore masculo parvo in caule gracillimo innovante e tomento in axillis foliorum plantæ fertilis oriente.
Hab. Magellan, in woods, Sandy Point, *Lechler*, 1022.

In size and appearance not unlike *Dicranum Drummondii*, B. & S., but in the structure of its leaves closely allied to those species of *Leptotrichum* in which the nerve occupies nearly the whole of the upper portion of the leaf.

L. australe (*Mitten*). Monoicum! caule elongato ramoso cæspitoso, foliis erecto-patentibus elongato-ovalibus ellipticisve, cellulis elongatis areolatis, nervo in subulam setaceam apice parce denticulatam longe excurrente, perichætialibus elongatis convolutis apice abruptis nervo longo capillari excurrente, theca in pedunculo circiter semiunciali pallide fusco ovali erecta fusca, flore masculo in ramo ex inferiori parte caulis fertili egrediente terminali.—*Lophiodon strictus*, Hook. fil. et Wils. in Fl. Antarct. Crypt. p. 18. t. lix. f. 2. *Didymodon longifolius, var.* 3. *penicillatus*, eorund. *l. c.* p. 102. *D. longifolius* et *Distichium capillaceum* in Flora Novæ Zelandiæ enumerati etiam huic speciei pertinent.
Hab. Cheshunt, Tasmania, *Mr. Archer*; New Zealand, *Dr. Lyall*; Falkland, Lord Auckland's and Campbell's Islands, *Dr. J. D. Hooker*.

This most distinct moss has been wrongly described with dioicous inflorescence and striated leaves. In the specimens collected by Mr. Archer the stems are four inches high, but the seta is not longer than in the shorter states of the plant. The capsules in all the specimens are too old to afford an idea of the perfect peristome; but in every other particular the structure is similar to that observable in the species of *Leptotrichum*, and not at all different from that of *Weissia stricta*, Hook. fil. et Wils. Flora Antarct. Crypt. p. 98, t. clii. f. 4, which is also referable to the same genus.

L. HYALINUM (*Mitten*). Dioicum? caule elongato ramoso, foliis erecto-patentibus e basi elongata elliptica convoluta hyalino-marginata subulato-angustatis, nervo subulam superiorem totam occupante apice parce denticulato, cellulis inferioribus elongatis subparallelogrammaticis sensim superne in minutas rotundatas transeuntibus firmis, perichætialibus basi latiore longioreque vaginantibus, theca in pedunculo luteo-fusco ovali-cylindracea.

Didymodon longifolius, var. 2. tenuifolius, Hook. fil. et Wils. Crypt. Antarct. p. 102.

Hab. On the ground on the hills, Hermite Island, Cape Horn, and in the Falkland Islands, *Dr. J. D. Hooker.*

In habit similar to *L. Hookeri,* C. Müll., but in the outline of its leaves more like *L. australe;* readily distinguished from both by the hyaline margins of its leaves. The male flower has not been seen.

L. OLDFIELDII (*Mitten*). Monoicum, habitu *L. affinis,* foliis e basi lata oblongo-ovata erecta longe subulatis patentibus apice parcissime denticulatis, cellulis angustis elongatis sensim superne brevioribus firmis nervo subulam superiorem totam occupante canaliculatis, perichætialibus basi longiore latioreque elliptica convolutis, theca in pedunculo elongato ætate rubro cylindracea arcuata, flore masculo gemmiformi brevifolioso in foliorum caulinorum axillis.

Hab. In Tasmania, *Mr. Oldfield,* No. 154.

Very near to *L. affine,* C. Müll., in size and appearance, but with leaves about twice as wide at the oblong base, and thence subulate.

L. capillaceum (Distichium, *B. & S.*).

Hab. Tasmania, behind Cumming's Head, Western Mountains, with *Conostomum pusillum, Mr. Archer.*

L. FERRUGINEUM (*Mitten*). Dioicum, caulibus cæspitosis, radiculis ferrugineis dense intertextis, foliis e basi erecta ovali-oblonga sensim attenuatis patentibus integerrimis nervo percurrente cellulis basi utrinque ad margines pluribus oblongis quadratisque parallelogrammaticis superioribus inæqualibus perichætialibus conformibus, theca in pedunculo rubro erecta globoso-ovata, operculo conico rostrato, peristomio e dentibus latis rubris dicranoideis annulo latiusculo composito.

Hab. On the ground, plain behind Cumming's Head, Western Mountains, Tasmania, *Mr. Archer.*

Whole plant dull ferruginous-green. Stems from half an inch to one inch in height. In general appearance it has some resemblance to *L. Jamesoni* (*Dicranum*), Taylor; but it is smaller, compactly cæspitose, and interwoven with intensely ferruginous radicles. The seta is about three lines long, rather stout, pale red. The small subglobose erect capsule readily distinguishes it from all its allies.

4. Trematodon, *Rich.*

T. flexipes (*Mitten*). Dioicus? cæspitosus, caule erecto breviusculo, foliis erecto-patentibus lanceolato-subulatis integerrimis nervo lato totam fere folii partem superiorem occupante, perichætialibus latis vaginantibus, theca in pedunculo brevi gracili flexuoso stramineo suberecta rufo-fusca collo pallidiori æquilongo, operculo curvirostrato, peristomio e dentibus rubris dicranoideis annulo composito.

Hab. On the ground, plain behind Cumming's Head, Western Mountains, Tasmania, *Mr. Archer.*

Very nearly resembling *T. brevicollis*, but with leaves in which the nerve occupies the whole of the upper three-fourths, the seta flexuose, and the peristome with distinctly cleft teeth.

5. Blindia, *Br. & Sch.*

B. acuta, *B. & S.*, var. *curviseta.*

Hab. Tasmania, on stones, rivulet behind Cumming's Head, Western Mountains, *Mr. Archer.*

6. Dicranum, *Hedw.*

* *Eudicranum.*

D. robustum, *Hook. fil. et Wils.*

Hab. Tasmania, Cheshunt, *Mr. Archer.*

D. pungens, *Hook. fil. et Wils.*

Hab. Tasmania, Cheshunt, *Mr. Archer.*

D. Billardieri, *Schw.*

Hab. Tasmania, on logs in creeks, *Mr. Archer.*

D. dicarpon, *Nees.*—D. leucolomoides, *C. Müll. in Bot. Zeit.* 1851, p. 549.

Hab. Tasmania, in many places, *Mr. Archer*; Wellington Falls, Mount Wellington, *Mossman*, No. 744.

Variable in appearance, but a most distinct species.

D. Menziesii, *Taylor.*—D. brachypelma, *C. Müll. in Bot. Zeit.* 1851, p. 550!

Hab. Tasmania, in creeks, *Mr. Archer.*

D. angustinerve (*Mitten*). Dioicum, *D. Billardieri* simile, caulibus brevibus ramosis, foliis patentibus subsecundis e basi subovali elongata sensim angustatis, nervo angusto percurrente dorso marginibusque apicem versus serrulatis, cellulis elongatis angustis alaribus oblongis quadratisque flavide fuscis in massam quadratam utrinque dispositis, perichætialibus convolutis internis vaginantibus subito in acumen

breve setiforme angustatis, theca in pedunculo breviusculo semiunciali arcuata inclinata basi strumosa, peristomio dentibus rubris dicranis.

Hab. Tasmania, on dead wood, *Mr. Archer* and others.

Nearly allied to *D. Billardieri*, but with somewhat the aspect of *D. reflexum*. It differs from *D. Billardieri* in the form of the wider portion of its leaves being more elongate, and the narrow upper part being shorter; the internal perichætial leaves are also furnished with a bristle-like point, which seems wanting in *D. Billardieri*.

** *Campylopus*.

D. introflexum, *Hedw*.

Hab. Tasmania, on logs, and on the ground, Cheshunt, *Mr. Archer*.

D. TORQUATUM (*Mitten*). *D. pyriformi* omnibus partibus maxime simile sed foliis a parte inferiori magis gradatim subulatis et lamina altiore a nervo distinguenda, cellulis in parte laminæ superiori quadruplo minoribus, foliis perichætialibus internis basi tenerioribus, pedunculo siccitate spiraliter torto.—*Campylopus pallidus*, ex parte Hook. fil. et Wils. Fl. New Zealand, xi. p. 68, t. 84. f. 3. *Dicranum flexuosum*, C. Müll. in adnot. ad Muscos Mossmanianos, Bot. Zeit. 1851, p. 551. *D.* (*Campylopus*) *torfaceum*, Mitten in Hook. Kew. Miscell. 1856, p. 257.

Hab. New Zealand, *Colenso, Sinclair, Mossman*; Tasmania, on decayed bogs, West-end Rivulet, Cheshunt, *Mr. Archer*; Victoria, Australia, *D. F. Müller*.

So very much does this species resemble *D. pyriforme* (Campylopus, *Schultz*), that it may readily be passed over as a state of that species, having the same soft appearance. The species referred to in the 'Flora of New Zealand' as the typical form gathered by Prof. Jameson in the Andes of Quito is a more robust species, with stiffer and less finely attenuated leaves, and a capsule rough at the base. *Dicranum nodosum*, Beauvais in Hb. Hooker, is a much larger moss, with leaves having a longer base, stouter nerve, and stiffer habit; it is in all probability synonymous with *Campylopus nivalis*, Brid. If *Campylopus* could be defined so as to distinguish it from *Dicranum*, there would be no necessity to alter the name of the present species; but it seems impossible to separate them in an extensive herbarium, notwithstanding the difference in the aspect of some of the species, and, there being a *Dicranum pallidum* from N. America previously published by Bruch and Schimper, an alteration has become unavoidable.

7. DIDYMODON, *Hedw*.

D. purpureus, *Hedw*. (Ceratodon, *Brid.*).

Hab. Tasmania, on rocks and stones, Western Mountains, *Mr. Archer*.

D. Tasmanicus (Tridontium, *Hook. fil.*).
Hab. Tasmania, fossiliferous limestone, Meander River, *Mr. Archer.*

D. papillatus, *Hook. fil. et Wils.*
Hab. Tasmania, the Hummocks, *Mr. Archer.*

D. cyathicarpus (Zygodon, *Mont.*).
Hab. Tasmania, Cheshunt, *Mr. Archer.*

This and the allied European species, *D. Lapponicus* and *D. Mougeotii*, referred to *Zygodon*, and more recently, by M. Schimper, proposed as distinct, under the name of *Amphidium*, scarcely differ from *Rhabdoweissia*, except in the absence of a peristome; and *Rhabdoweissia* itself is not generically separable from *Didymodon*.

8. Holomitrium, *Brid.*

H. cirrhatum (Weissia, *Hedw.*).
Hab. Tasmania, Cheshunt, *Mr. Archer.*

Like those specimens collected in Victoria, Australia, by Dr. F. Müller, but, except in being rather more slender, not different from European specimens.

III. Leucobryaceæ.

1. Leucobryum, *Hampe.*

L. candidum, *Dill.*
Hab. Tasmania, Cheshunt, *Mr. Archer.*

IV. Trichostomaceæ.

1. Astomum, *Hampe.*

A. cylindricum (Phascum, *Taylor*).
Hab. Tasmania, Cheshunt, *Mr. Archer.*

2. Weissia, *Hedw.*

W. controversa, *Hedw.*
Hab. Tasmania, Port Sorrell, Long Hill, and Cheshunt, *Mr. Archer.*

3. Tortula, *Hedw.*

T. Australasiæ, *Hook. et Grev.*
Hab. Tasmania, west side of Cataract, Launceston, *Mr. Archer.*

T. torquata, *Taylor.*
Hab. Tasmania, Doublegate Park, *Mr. Archer.*

T. calycina, *Schw.*
Hab. Tasmania, Port Lovell, *Mr. Archer.*

T. Knightii (*Mitten*). Monoica, habitu statura coloreque *T. Northianæ* simillima, foliis siccitate crispatis humidis patentibus e basi paululum latiore subovata lanceolatis apice acuminatis comalibus sensim ad apicem angustatis lanceolatis marginibus undulatis integerrimis nervo concolori excurrente mucronatis, cellulis basi hyalinis elongatis utrinque ad margines altius quam in medio adscendentibus subito in minutas viridas obscuras transeuntibus, perichætialibus longioribus paululo latioribus, theca in pedunculo rubro cylindrica, operculo subulato theca dimidio breviore, peristomio et flore masculo *T. Northianæ*.

Hab. New Zealand, *Colenso, Kerr, Knight.*

This is the *T. cæspitosa var.* of Hook. fil. et Wils. in Fl. New Zealand; but it is assuredly distinct from *T. Northiana*, Grev., in the much narrower leaves with undulated margins.

4. Acaulon, *Hampe.*

A. apiculatum, *Hook. fil. et Wils. Fl. Nov. Zeland.* par. ii. p. 58, t. 83. f. 1, ubi calyptra sub fig. 5 delineata delenda est et capsulæ apiculus in figuris 3 et 4 calyptram veram repræsentat.

Var. turgidum foliis internis turgide concavis longioribus.

Hab. Tasmania, Cheshunt, *Mr. Archer.*

These specimens are so different at first sight from those from New Zealand, from the turgid, inflated state of the perichætial leaves, that, relying on the figure, they were considered distinct; but an examination of authentic specimens shows that the species has not been fairly illustrated. The capsule is globose, without any apiculus; and the apiculus observable in the figures above quoted represents, much too large, the minute calyptra. The calyptra figured more nearly represents one of the lower leaves than any other portion of the moss. The margins of the leaves are generally obtusely crenate at the apex.

5. Desmatodon, *Brid.*

D. nervosus, *Brid.*

Hab. Tasmania, Cheshunt, *Mr. Archer.*

6. Syntrichia, *Brid.*

S. princeps (Tortula, *De Not.*; Barbula Mülleri, *B. & S.*).

Hab. Tasmania, on rocks and stones, the Hummocks, near Cleveland, and on rocks, Port Sorrell, *Mr. Archer.*

Divided by Mr. Wilson (*Fl. Tasmanica ined.*) into three species, distinguished from each other by the outline of the leaves; but the structure is the same in all, and the differences appear of the same importance as those observable in forms of *S. ruralis* and *S. lævipila.*

S. Fuegiana (*Mitten*). Dioica, *S. principi* simillima sed minor, foliis erecto-patentibus siccitate appressis ambitu ovato-lingulatis apice obtusis nervo in pilum hyalinum flexuosum lævem excurrente, margine

plus minus recurvo integerrimo, cellulis superne minutissimis rotundatis obscuris e medio ad basin pallidioribus elongatis pellucidis, perichætialibus latioribus, theca in pedunculo elongato rubro cylindrica curvata, operculo subulato, peristomio elongato dimidio inferiore tubuloso.

Hab. Falkland Islands, on sand-hills in Uranie Bay, *Dr. J. D. Hooker*; Capo Negro, Magellan, *Lechler*, 1088.

Rusty-green; nearly allied to *S. princeps* and to *S. ruralis*, but smaller; stems half an inch to one inch high, seta an inch long. Easily recognized by its ovate leaves.

7. Streptopogon, *Wils.*

S. mnioides, *Mitten* (Barbula, *Schw.*).

Hab. Tasmania, on logs in copses, Falls-run, *Mr. Archer*; Chili, *Lechler*, 654.

The calyptra of this species resembles that of *S. erythrodonta*, to which it is very closely allied.

Another species of this genus is *S. marginatus* (Schistidium, *Hook. fil. et Wils. Crypt. Antarct.* t. 151. f. 6).

8. Encalypta, *Schreb.*

E. australis (*Mitten*). Monoica, *E. vulgari* simillima, foliis inferioribus ligularibus comalibus sub-elliptico-spathulatis obtusiusculis nervo percurrente dorso apice parce denticulato scabrove margine ob papillarum prominentiam erosula, theca cylindrica lævi gymnostoma, operculo subulato sub-æquilongo, calyptra apice lævi.

Hab. Tasmania, near the Cataract, Launceston, and on the fossiliferous limestone near Cheshunt, *Mr. Archer*; New Zealand, *Colenso, Kerr, Knight.*

Differs from *E. vulgaris* in the less rounded apices of its leaves and smooth point of the calyptra.

V. Grimmiaceæ.

1. Grimmia, *Ehrh.*

* *Schistidium.*

G. apocarpa, *Hedw.*

Hab. Tasmania, on the rocks, the Falls; on stones, the Hummocks; on rocks, Meander River, and Jackey's Plain Creek, *Mr. Archer.*

** *Eugrimmia.*

G. pulvinata, *Hook. et Tayl.*

Hab. Tasmania, Cheshunt, and *var. β. Africana*, on rocks, Port Sorrell, and elsewhere, *Mr. Archer.*

G. trichophylla, *Grev.*
Hab. Tasmania, Cheshunt, *Mr. Archer.*

G. leucophea, *Grev.*
Hab. Tasmania, on stones, the Hummocks, *Mr. Archer.*

*** *Rhacomitrium.*

G. Symphyodonta, *C. Müller, Synops.* i. p. 809.—G. emersa, *ejusd., Bot. Zeit.* 1851, p. 562.
Hab. Tasmania, on rocks, 'The Falls,' *Mr. Archer*; Mount Wellington, *Mossman*, No. 743; elsewhere, *Mr. Oldfield.*

G. crispula (Rhacomitrium, *Hook. fil. et Wils. Crypt. Antarct.*).
Hab. Tasmania, on rocks and stones, rivulet south of Cumming's Head, Western Mountains, *Mr. Archer.*

2. Glyphomitrium, *Brid.*

G. acutifolium (Ptychomitrium, *Hook. fil. et Wils.*; *Flor. Tasman. ined.*).
Hab. Tasmania, on rocks, Port Sorrell, *Mr. Archer.*

G. serratum (*Mitten*). *G. polyphyllo* minus, foliis patenti-recurvis e basi ovata lanceolatis sensim acutis margine apicem versus serrato inferne recurvo nervo percurrente, cellulis basi paucis elongatis mox in rotundatas inter se remotiusculas diametro circiter $\frac{1}{4000}$ unciæ metientibus transeuntes, perichætialibus caulinis similibus, theca in pedunculo quadrilineari ovali-cylindrica, operculo subulato subæquilongo, peristomio dentibus longiusculis rubris asperulis profunde fissis basi geminatim approximatis, calyptra *G. crispatæ.*
Hab. Tasmania, rocks north side of the Cataract, Launceston, *Mr. Archer.*

In size and habit so nearly resembling *G. acutifolium* as to be readily mistaken for it, but safely distinguished by the serrated leaves, which are shorter and less narrowed towards the apex than those of *G. polyphyllum.*

G. Adamsoni (*Mitten*). *G. crispato* simile sed minus, foliis inferne paululum dilatatis lineari-lanceolatis acutis nervo percurrente integerrimis, cellulis basi paucis oblongis parallelogrammaticis cito in parvas rotundatas distinctas diametro circiter $\frac{1}{3000}$ unciæ metientes transeuntibus, perichætialibus nullis a caulinis difformibus, theca in pedunculo trilineari ovali, operculo subulato, peristomio dentibus brevibus cruribus plus minus discretis.
Hab. Australia; common on trap-rocks, Melbourne, *Mr. Adamson*, No. 60.

Smaller than *G. crispatum*, with leaves scarcely wider at the base than they are in the upper part, their cells all distinct, and the capsule shorter.

G. MÜLLERI (*Mitten*). Monoicum, habitu *G. crispati*, foliis e basi lata subquadrata superne paululum dilatata vaginante annotatis patentibus lanceolatis apice obtusis acutatis subcucullatis nervo sub summo apice evanido carinatis margine integerrimo, cellulis basi ad mediam partis latioris oblongis parallelogrammaticis inde ad apicem parvis rotundatis approximatis obscuriusculis diametro circiter $\frac{1}{3000}$ unciæ metientibus, perichætialibus tribus brevioribus ovatis acuminatis acutioribus, theca in pedunculo tri-quadri-lineari ovali ætate corrugata, operculo subulato subæquilongo, peristomio vetusto, et calyptra *G. crispati*.

Hab. Australia, Victoria, Rocky Mountains, called the Glass-houses, Moreton Bay, and Brisbane River, *Dr. Ferd. Müller*.

Densely tufted stems about half an inch high, as thick as those of *G. polyphyllum*, with hard crisped foliage.

G. FERNANDESIANUM (*Mitten*). *G. crispati* simile sed robustius, foliis e basi erectiuscula ovali patentibus lanceolatis acutis incurvis nervo crasso lato percurrente marginibus integerrimis, cellulis basi infima paucis oblongis parallelogrammaticis cito abbreviatis superioribus minutis rotundatis distinctis, diametro circiter $\frac{1}{3000}$ unciæ metientibus, parietibus pellucidis, perichætialibus conformibus, theca in pedunculo trilineari parva ovali-cylindrica, operculo æquilongo subulato, calyptra apice subscabra.

Hab. Insula Juan Fernandez, *Bertero*, 1591; et *Cuming*, 1486.

More robust, but with the same habit and appearance as *G. crispatum*. The capsule is small for the size of the moss. The very thick broad nerve readily distinguishes this species from its allies.

VI. ORTHOTRICHACEÆ.

1. ZYGODON, *Hook. & Tayl.*

Z. Menziesii (Codonoblepharum, *Schw.*).

Hab. Tasmania, on trees in open ground, and in the forests, *Mr. Archer*.

Z. Reinwardti, *Schw.*

Hab. Tasmania, on trees, Stackhouse Falls, *Mr. Archer*.

Z. Brownii, *Schw.*

Hab. Tasmania, on logs and dead trees, copses and rivulets, Cheshunt, *Mr. Archer*.

Z. intermedius, *B. & S.*

Hab. Tasmania, Cheshuut, *Mr. Archer*; Mount Wellington, *Mossman*, No. 758 in part.

2. ORTHOTRICHUM, *Hedw.*

O. Tasmanicum, *Hook. & Wils.*

Hab. Tasmania, Falls Run, *Mr. Archer*.

3. ULOTA, *Brid.*

U. FULVELLA (*Mitten*). Monoica, caule procumbente ramis pluribus brevibus ramoso, foliis, madore, e basi late ovali erecta concava serie unico cellularum oblongarum parenchymaticarum hyalinarum marginata interioribus angustis elongatis luteis patentibus, siccitate subtortis non crispatis, longe angusto lanceolatis nervo sub apice evanido carinatis, margine lævi, cellulis rotundatis diametro $\frac{1}{3000}$ unciæ metientibus, perichætialibus a basi sensim lanceolatis caulinis paululum latioribus erectioribus, theca in pedunculo ea duplo longiore ovali plicata, collo sensim attenuato, peristomio dentibus 8 bigeminatis apicibus secedentibus, interno —?, calyptra ramentis æquilongis luteis. —*Orthotrichum luteolum*, Hook. fil. et Wils. Crypt. Antarct. ex parte.

Hab. Hermite Island, *Dr. J. D. Hooker.*

Like *U. germana*, but rather larger, its leaves not crisped when dry, narrower, the structure of the base different.

U. LOBBIANA (*Mitten*). *U. carinatæ* habitu colore statura crispationeque foliorum simile, foliis angustioribus e basi erectiuscula suborbiculari seriebus pluribus cellularum hyalinarum quadratarum crasse limbatarum marginata interioribus angustis luteis angustatis longe lanceolatis patentibus nervo carinatis marginibus minute erosis, cellulis rotundatis approximatis diametro $\frac{1}{3000}$ unciæ metientibus obscuriusculis minutissime papillosis, perichætialibus caulinis duplo longioribus vaginula nuda, theca in pedunculo ea quadruplo longiore, calyptra ramentis stramineis eam superantibus dense vestita.

Hab. Patagonia and Chiloe, *Mr. Lobb.*

Differs from *U. carinata* in its narrower leaves, with the marginal hyaline cells shorter, thick-walled, and in the naked vaginula.

U. CARINATA (*Mitten*). Monoica, pulvinata, foliis siccitate crispatis madore e basi erectiuscula suborbiculari concava cellulis marginalibus oblongis parallelogrammaticis hyalinis in seriebus pluribus dispositis interioribus elongatis angustis luteis lanceolatis elongatis nervo sub apice evanido profunde carinatis margine minute crenulatis cellulis minutis depressis approximatis latitudine $\frac{1}{2000}$ longitudine $\frac{1}{4000}$ unciæ metientibus minute papillosis obscuriusculis, perichætialibus longioribus latioribus erectioribus vaginula pilosa, theca in pedunculo quadruplo longiore ovali plicata, operculo convexo brevi rostrato, calyptra lævi, peristomio dentibus 8 bigeminatis ciliis 8 capillaribus subæquilongis.

Hab. Chiloe, *Mr. Lobb.*

Rather larger than *U. fulvella*, leaves wider, with cells more densely placed, crisped in drying, base of the leaf shorter than in its allies, capsule without an attenuated neck.

U. MACROCALYCINA (*Mitten*). Monoica, caule repente, ramis brevibus erectis, foliis patentibus siccitate appressis strictis e basi lata obovata

erectiuscula concava seriebus cellularum hyalinarum oblongarum parenchymaticarum prosenchymaticarumque marginata interioribus angustis elongatis angustatis brevi-lanceolatis apice obtusiusculis nervo sub apice evanido carinatis integerrimis, cellulis remotiusculis depressis latitudine $\frac{1}{2500}$ longitudine $\frac{1}{5000}$ unciæ metientibus lævibus, perichætialibus exsertis late-lanceolatis erectis obtusis laxe convolutis nervo medio evanido, theca in pedunculo eam duplo superante ovali plicata, operculo conico acuminato, peristomio dentibus 8 bigeminatis, ciliis angustis 8 brevioribus?, calyptra nuda fusca.

Hab. Straits of Magellan, on trunks of trees, Port Famine, *Dr. Lyall.*

Less than *U. Hutchinsiæ*; the straight cauline and large wide obtuse perichætial leaves readily distinguish it from its allies.

U. ERemitensis (*Mitten*). Monoica, cæspitulosa, foliis siccitate vix mutatis patentibus e basi erectiuscula suborbiculari lata concava angustatis lineari-lanceolatis nervo sub apice evanido carinatis margine ad apicem baseos dilatato et inde recurvo minute crenulato cellulis ad baseos latera seriebus pluribus parallelogrammaticis hyalinis interioribus angustis cito in rotundatas diametro $\frac{1}{3000}$ unciæ metientes transeuntibus papillosis, perichætialibus lanceolatis, theca in pedunculo triplo longiore ovali plicata basin versus lævi, peristomio dentibus 8 bigeminatis apicibus liberis ciliis 8 angustis capillaribus subæquilongis, calyptra glabra.

Orthotrichum luteolum, Hook. fil. et Wils. Crypt. Antarct. ex parte.

Hab. Hermite Island, Cape Horn, *Dr. J. D. Hooker.*

A little larger than *U. germana* (Mont.), and with the bases of its leaves a little longer, their cells in the upper part not depressed, the leaves themselves not crisped when dry, and the cilia of the internal peristome capillary.

U. GLABELLA. Monoica, subpulvinata, foliis siccitate appressis subtortis madore e basi erectiuscula suborbiculari concava cellulis marginalibus oblongis parallelogrammaticis hyalinis in seriebus pluribus dispositis interioribus elongatis angustis angustatis longe lanceolatis patentibus nervo sub apice evanido carinatis margine minute crenulato cellulis remotiusculis rotundatis diametro $\frac{1}{3000}$ unciæ metientibus papillosis, perichætialibus paululum latioribus, theca in pedunculo eam duplo superante ovali plicata, collo brevi, calyptra nuda apice rugosa.

Orthotrichum luteolum, var., *Hook. fil. et Wils. Crypt. Antarct.*

Hab. Hermite Island, Cape Horn, *Dr. J. D. Hooker.*

The leaves not crisped in drying and the glabrous calyptra distinguish this from its allies. In size it agrees with *U. germana*. No perfect peristomes have been seen.

U. FUEGIANA (*Mitten*). Monoica, caule procumbente ramoso cæspituloso, foliis siccitate tortis madore e basi late obovata erectiuscula concava margine cellulis oblongis hyalinis parallelogrammaticis in seriebus pluribus marginata inde angustatis longe lanceolatis patentibus nervo

sub apice evanido carinatis, cellulis remotiusculis rotundatis diametro $\frac{1}{3000}$ unciæ metientibus lævibus margine apicem versus eroso, perichætialibus erectioribus paululum latioribus vaginula nuda, theca in pedunculo ea duplo longiore ovali, collo sensim attenuato plicato, peristomio dentibus 8 bigeminatis plus minus fissis, ciliis ——?, calyptra ramentis paucis brevibus appressis pilosa.

Orthotrichum luteolum, *Hook. fil. et Wils. Crypt. Antarct.* quoad iconem calyptræ. O. coarctatum, *Hook. et Grev.*, huc pertinere videtur.

Hab. Hermite Island, Cape Horn, *Dr. J. D. Hooker.*

Very near to *U. fulvella* in habit, size, and in the torsion of its leaves; but the base of its leaves with many series of pellucid marginal cells, the margin towards the apex irregularly erose, and the calyptra with few appressed hairs.

U. Darwinii (*Mitten*). Pulvinata, foliis e basi ovali concava erectiuscula cellulis hyalinis oblongis in seriebus pluribus dispositis interioribus angustis luteis patentibus longe lanceolatis nervo carinatis marginibus minute erosis, cellulis rotundatis remotiusculis diametro $\frac{1}{3000}$ unciæ metientibus sublævibus, perichætialibus longioribus erectioribus paululum latioribus vaginula pilosa, theca in pedunculo eam duplo superante ovali plicata collo sensim attenuato, operculo convexo brevi rostrato, calyptra ramentis brevibus pilosa, peristomio dentibus 8 bigeminatis ciliis 8 capillaribus paululum brevioribus.

Hab. Terra del Fuego, *Mr. Darwin.*

Resembles very closely *U. Fuegiana*, but with larger leaves, which have their cells more closely placed, and the vaginula pilose.

U. lutea (*Mitten*). Monoica, dense pulvinata, fulvo-lutea, foliis siccitate crispatis madore patentibus e basi obovata concava erectiuscula lineari-lanceolatis nervo flavo sub apice evanido carinatis cellulis utrinque ad baseos ovatæ latera circiter quadriseriatis oblongis parallelogrammaticis hyalinis interioribus angustissimis elongatis luteis superioribus rotundis diametro $\frac{1}{3000}$ unciæ metientibus in seriebus 10–12 inter marginem et nervum in folii medio dispositis papillosis margine minute crenulato et ubi basis in partem superiorem angustatur recurvo, perichætialibus lanceolatis latioribus vaginula glabra, theca in pedunculo vix duplo longiore ovali cylindrica plicata collo elongato crassiusculo, operculo convexo brevi-rostrato, peristomio dentibus 8 bigeminatis ciliis 8 angustis tertio brevioribus, calyptra ramentis exstantibus elongatis pilosa.

Hab. Tasmania, on trees, rivulet behind Cumming's Head, Western Mountains, *Mr. Archer*; Mount Wellington, and in New Zealand, Wairoa River, Kaipara, *Mossman.*

Corresponding in size with *U. crispa*, but with leaves of a different form at the base, erose margins, and cells in the upper portion larger and further apart; the capsule is also thinner.

4. Macromitrium, *Brid.*

M. microphyllum (*Hook.*).
Hab. Tasmania, on trees in creeks and damp woods, *Mr. Archer.*

M. pusillum (*Mitten*). Dioicum? *M. microstomo* simillimum, foliis siccitate spiraliter tortis madore patentibus lineari-lanceolatis apice breviter apiculatis nervo fusco sub apice evanido carinatis integerrimis cellulis basi angustis elongatis superioribus rotundatis diametro circiter $\frac{1}{3000}$ unciæ metientibus breviter papillosis distinctis, perichætialibus internis brevioribus ovatis acuminatis, theca in pedunculo circiter trilineari ovali plicata ore intensiore colorato, calyptra nuda.
Hab. On stones, Cataract Hill, Tasmania, *Mr. Archer.*

Leaves longer and narrower than those of *M. microstomum*, with cells far larger than those of the last-named species, having a diameter of $\frac{1}{3000}$th of an inch.

M. ligulare (*Mitten*). Dioicum? *M. erosulo* simile, foliis siccitate tortis subcirrhatis linearibus ligulatis obtusis vel nervo excurrente brevissime apiculatis carinatisque cellulis inferne pro spatio brevi ovoideis cito in rotundatas approximatas papillosas obscuriusculas transeuntibus margine erosulo, perichætialibus brevioribus ovatis acutis, theca in pedunculo trilineari ovali circa os intensius colorata et plicata, operculo conico acuminato, calyptra nuda, peristomio simplici dentibus brevibus.
Hab. New Zealand, *Kerr*; Waikeki, *Dr. Sinclair.*

Smaller than *M. prorepens*; leaves more crisped, with cells at their bases of an oblong or ovoid form.

M. erosulum (*Mitten*). Dioicum? caule repente, ramis brevibus simplicibus ramulosisve dense stratosis, foliis siccitate compacte tortis incurvisque madore patentibus e basi subelliptica ligulatis obtusis nervo flavo-fusco excurrente breviter mucronatis carinatisque margine papillis prominentibus eroso, cellulis inferioribus elongatis angustis lævibus superioribus apicem versus obscuriusculis grosse papillosis, perichætialibus paululo latioribus acutis, theca in pedunculo circiter trilineari ovali fusca circa os intensius colorata et plicata, operculo subulato subæquilongo, peristomio simplici dentibus brevibus, calyptra ramentis appressis sparsis pilosa.
Hab. New Zealand, *Kerr*; near Wellington, *Stephenson*; Middle Island, *Bidwill*; Waikeki, *Milne.*

In habit, size, and colour similar to *M. prorepens*, but the bases of its leaves narrower, the upper portion longer, more obtuse, the cells larger and less obscure. *M. prorepens* is monoicous.

M. Archeri (*Mitten*). *M. hemitrichodi* simillimum, foliis siccitate tortis subcrispatis madore patentibus inferne ellipticis inde lanceolatis obtusiusculis nervo excurrente carinatis brevissime apiculatis

margine minutissime eroso cellulis basi pro spatio brevi elongatis mox in rotundatas transeuntibus papillosis apicem versus obscurioribus, perichætialibus brevioribus duplo latioribus acutis, theca in pedunculo tri-quadrilineari elongato ovali sub ore intensius colorato plicata, peristomio nullo ?, operculo subulato, calyptra nuda.

Hab. On trees, Cheshunt, Tasmania, *Mr. Archer*; on dead branches of trees, Kermandec Rivulet, *Mr. Oldfield.*

Fulvous; in size and general appearance scarcely different from *M. hemitrichodes,* to which at least in part belongs *M. amœnum,* Hornschuch, according to authentic specimens; but in the present, the leaves, although agreeing in form, have their cells more widely separated, rather larger, and not obscure, as in *M. hemitrichodes,* in which too the leaves are smoother.

M. ORTHOPHYLLUM (*Mitten*). Dioicum, *M. longirostri* habitu statura coloreque simile, foliis siccitate appressis strictis madore patentibus late lanceolatis breviter apiculatis nervo excurrente concolori carinatis margine integerrimo cellulis e basi ad medium elongatis angustis inde ad apicem ovoideis latitudine circiter $\frac{1}{4000}$ unciæ metientibus, perichætialibus longioribus latioribus erectis longiore apiculatis, theca in pedunculo circiter sex lineari ovali ore plicato, collo sensim attenuato, operculo subulato subæquilongo, peristomio simplici dentibus brevibus liberis, calyptra nuda.

Hab. New Zealand, *Kerr, Knight.*

Very distinct from all its congeners in the leaves being straight, and, except that they are appressed to the stem, unaltered in drying.

M. Mossmannianum (C. Müller, Bot. Zeit. 1851, p. 561) is identical with *M. gracile,* Hook.

VII. FUNARIACEÆ.

1. EPHEMERUM, *Hampe.*

E. cristatum (Phascum, *Hook. et Wils.*).

Hab. Tasmania, Cheshunt, *Mr. Archer.*

2. LEPTANGIUM, *Mont.*

L. repens (Anictangium, *Hook. Musc. Exot.*).

Hab. Tasmania, Port Sorrell, and north side of Cataract, Launceston, *Mr. Archer.*

This curious moss, which has no affinity with *Hedwigia* nor with *Erpodium,* seems to accord very nearly with Dr. Montagne's description of *L. Perrottetii* from Senegambia, and from the structure of its leaves appears to be more nearly allied to this family than to any other.

3. PHYSCOMITRIUM, *Brid.*

P. CONICUM (*Mitten*). *P. pyriformi* simile, foliisque conformibus serrulatis cellulis fere dimidio minoribus marginalibus intensius coloratis,

theca in pedunculo bilineari pyriformi, operculo depresso-conico umbonato.

Hab. Tasmania, Leith's Creek, *Mr. Archer.*

Less than the usual states of *P. pyriforme,* but very similar to it in appearance.

4. Entosthodon, *Schw.*

E. laxus (Physcomitrium, *Hook. fil. et Wils.*).

Hab. Tasmania, on stones, rivulet near Cumming's Head, Western Mountains, *Mr. Archer.*

E. apophysatus (Physomitrium, *Taylor*).

Hab. Tasmania, the Hummocks, *Mr. Archer.*

E. productus (*Mitten*). Monoicus, parvulus, humilis, foliis inferne ovatis in acumen lanceolatum angustatis integerrimis nervo sub apice evanido cellulis elongatis, theca in pedunculo bilineari parva ovali, operculo depresso-convexo umbonato, peristomio nullo?

Hab. Tasmania, behind Cumming's Head, Western Mountains, *Mr. Archer.*

A small species allied in the form of its leaves to *E. Mittenii,* Dzy. et Molk. The fruit too young to exhibit the peristome, if indeed that organ is present.

5. Funaria, *Schreb.*

F. radians (Weissia, *Hedw.*).

Hab. Tasmania, the Hummocks, Port Sorrell, bark near Cheshunt, and on rocks north side of Cataract, Launceston, *Mr. Archer.*

F. hygrometrica, *Dill.*

Hab. Tasmania, on stones of fossiliferous limestone, and on the chimney of a cottage, Cheshunt, *Mr. Archer.*

VIII. Splachnaceæ.

1. Splachnum, *L.*

(*Eremodon,* Brid.)

S. octoblepharum, *Hook.* (Dissodon plagiopus, *C. Müller*).

Hab. Tasmania, on cowdung, Sand Hill, on logs, Smith's Creek, *Mr. Archer.*

IX. Bartramiaceæ.

1. Bartramia, *Hedw.*

* *Eubartramia.*

B. Halleriana, *Hedw.* (B. Mossmaniana, *C. Müller, Bot. Zeit.* 1851, p. 552).

Hab. Tasmania, on rocks, Elliott Rivulet, rivulet behind Cumming's

Head, and in a rivulet north side of the Western Mountains, at an altitude of about 2000 feet, *Mr. Archer.*

Notwithstanding the observations of M. C. Müller, there appears to be no real difference between these and European specimens.

** *Vaginella.*

B. papillata, *Hook. fil. et Wils. in Fl. Nov. Zealand.* p. 89, t. 86. f. 4. (B. acerosa, *Hampe, Plantæ Muellerianæ!*)
Hab. Tasmania, east side of Ovens Creek, *Mr. Archer.*

B. FRAGILIS (*Mitten*). Dioica? dense cæspitosa, caule erecto subsimplici, foliis densis fragillimis erecto-patentibus e basi appressa laxe vaginante oblonga superne paululum dilatata ibique tenuiter hyalino marginata laxe areolata subito subulato longe lanceolatis cellulis obscuris densis nervo percurrente margine dorsoque serrulatis, perichætialibus lanceolatis inconspicuis, theca in pedunculo breviusculo rubro globosa plicata erecta, operculo brevi conico, peristomio externo normali interno processibus brevissimis rudimentariis.
Hab. On rocks, rivulet behind Cumming's Head, Western Mountains, Tasmania, *Mr. Archer*; New Zealand, *Mr. Kerr.*

More densely and compactly cæspitose than *B. papillata*, Hook. fil. et Wils. The subulate portion of the leaf wider, less papillose, and not so obscure. The inflorescence appears to be dioicous. The leaves are so densely congested that the vaginant base is not erect, but only appressed to those above it, and the slightest touch suffices to detach them from the stem.

2. PHILONOTIS, *Brid.*

(*Conostomum.*)

P. pusilla. (Conostomum, *Hook. fil. et Wils. in Fl. Nov. Zeland.*)
Hab. Tasmania, on rocks, the Falls, rivulet behind Cumming's Head, Western Mountains, *Mr. Archer.*

P. australis. (Conostomum, *Swartz.*)
Hab. Tasmania, in the same localities as the preceding, but barren, *Mr. Archer.*

Bartramia (*Philonotis*) *curvirostra*, Mitten, collected in Victoria, Australia by Dr. F. Müller; belongs to the same section as the two foregoing species, but is much smaller.

(*Philonotis.*)

P. appressa. (Bartramia, *Hook. fil. et Wils. in Fl. Nov. Zeland.*)
Hab. Tasmania, on rocks, Elliott Rivulet, rivulet near Cumming's Head, Western Mountains, *Mr. Archer.*

P. VAGANS (*Mitten*). Dioica, caule elongato ramoso, foliis patentibus ovatis sensim acutis nervo angusto excurrente marginibus cellulis angustatis subcartilagineis limbatis apicem versus serratis cellulis

omnibus conformibus magnis pellucidis parietibus angustis, perichætialibus e basi latiore lanceolatis, theca in pedunculo elongato rubro horizontali globoso-ovali plicata collo vix ullo, operculo breviter conico, floribus masculis in ramis gracilioribus laxifoliis foliis perigonialibus latis apice obtusiusculis cymbiformi-concavis superne cellulis angustis areolatis.

Bryum vagans, *Hook. fil. et Wils. Crypt. Antarct.*

Hab. Hermite Island, *Dr. J. D. Hooker*; Sandy Point, Magellan, and Chili, *Lechler*, 3063.

This fine moss has been referred by M. C. Müller to *Meesia*; the fertile state is named by M. Schimper, in Lechler's collection, *Philonotis dimorpha*, Schimper, MSS.

3. Breutelia, *B. & S.*

B. affinis. (Bartramia, *Hook.*)

Hab. Tasmania, The Falls, *Mr. Archer.*

B. comosa (*Mitten*). Dioica, caule erecto ramis pluribus confertis comosis inferne fusco-tomentoso, foliis e basi brevi erecta superne dilatata utrinque ad margines seriebus pluribus cellularum majorum hyalinarum limbatis angustatis lanceolatis patentibus nervo excurrente piliformi mucronatis plicatis margine serrulatis papillosis, perichætialibus e basi sensim angustatis late lanceolatis, theca in pedunculo elongato sesquiunciali ovali inclinata plicata, operculo conico, peristomio normali.

Hab. New Zealand, Manikau Forest, N. Island, *Col. Bolton.* Bay of Islands, *Dr. Jolliffe.* Gathered also by *Dr. J. D. Hooker, Mr. Kerr,* and *Mr. Knight.* Tasmania, on rocks and earthy banks, East Creek, and rivulet near Cumming's Head, Western Mountains, *Mr. Archer.* Wellington Falls, Mount Wellington, *Mossman*, 744 in part.

Differs from *B. pendula* in the form of the base of its leaves and of its capsule.

B. dumosa (*Mitten*). Dioica, caule erecto ramis confertis dumoso inferne radicellis fuscis intertexto, foliis e basi erecta superne dilatata caulem amplectente cellulis fere omnibus conformibus angustatis lanceolatis patenti-divaricatis plicatis papillosis siccitate non mutatis nervo tenui excurrente mucronatis margine serrulato, perichætialibus ovatis acumine lanceolato, theca in pedunculo erecto breviusculo rarius elongato oblonga nutante plicata, operculo brevi conico, peristomio normali.—*Bartramia pendula*, Hook. fil. et Wils. in Crypt. Antarct. ex parte.

Hab. Hermite Island and Kerguelen's Land, *Dr. J. D. Hooker.* Chiloe, *Lobb.* Chili, *Lechler*, 813 and 809 in part.

Differs from *B. pendula* in the clasping bases of its more divergent leaves, without the band of enlarged cells on each side. In Mr. Lobb's specimens the seta is an inch and a half long; in those collected by Dr. Hooker it is about half an inch.

B. DIVARICATA (*Mitten*). Dioica, caule elongato inferne tomentoso subsimplici, foliis e basi brevi caulem amplectente cellulis hyalinis pluribus ad angulos marginum congestis divaricatis lanceolatis plicatis papillosis margine serrulatis nervo tenui excurrente mucronatis siccitate subflaccidis, perichætialibus ovatis integerrimis nervo angustissimo, theca in pedunculo elongato horizontali oblongo-ovali collo pyriformi attenuato, operculo conico, peristomio normali.

Hab. New Zealand, *Colenso, Dr. J. D. Hooker, Knight, Lyall, Sinclair*; Tasmania, Cheshunt, *Mr. Archer.*

Resembles the larger states of *B. pendula*, but differs in its divaricated leaves, which have, when dry, a subflaccid appearance, a differently formed base, and the stems almost simple.

B. pendula, which has been much misunderstood, varies greatly in its size, being sometimes not larger than the usual states of *Philonotis fontana*, as in the original specimens gathered by Menzies, at others as large as *B. gigantea*, Schwægrichen's figure 161 having been taken from this state; but the capsule is not erect. The *Hypnum elongatum*, Hook. fil. et Wils. in Crypt. Antarct. t. 60, is certainly of this genus, and may be a form of *B. pendula*. *Hypnum consimile*, Hook. fil. et Wils. in Crypt. Antarct. t. 60, is also to be referred to *Breutelia*.

B. Sieberi, of which some specimens have been gathered by Mr. Oldfield, may be thus characterized:—

B. SIEBERI, *Hornsch. in Musc. Sieber.* No. 12. Dioica, caule procumbente suberectove ramulis brevibus fasciculatis ramoso innovante iterumque ramoso inferne dense radiculoso, foliis haud nitidis e basi brevi erectiuscula ad insertionem contracta patentibus lanceolatis estriatis nervo angusto in acumen setaceo-pungens excurrente marginibus serrulatis inferne recurvis cellulis omnibus elongatis angustis papillosis, perichætialibus conformibus, theca in pedunculo rubro unciali apice flexura angusta pendula ovali plicata, operculo depresso conico, peristomio parvo normali? flore masculo foliis quadruplo latioribus late ovatis patulis nervo superne evanido.

Hab. Tasmania, Mount Wellington, *Dr. J. D. Hooker* and *Mr. Oldfield*; New Holland, *Sieber.*

Stems in all the Tasmanian specimens scarcely exceeding an inch in height; colour of the foliage yellowish-green, without gloss; leaves narrow; cells in the upper portion elongated, everywhere distinctly papillose; alary cells few, indistinct. In all the allied species the cells of the upper portion of the leaf are shortened.

B. PLICATA (*Mitten*). *B. divaricatæ* simillima, foliis siccitate curvatis e basi erecta plicata divergentibus lanceolatis nervo percurrente marginibus arcte serrulatis cellulis basi angustis elongatis pellucidis utrinque ad latera seriebus pluribus hyalinis superioribus quadrato-

oblongis inde rotundatis densissime minutissimeque papillosis subopacis.

Hab. Chili, *Lechler*, 809 in part.

In the curled dry foliage, this agrees with *B. divaricata*; but in the plicate base and minutely papillose subobscure areolation of the upper part of the leaf, it recedes from all the species yet known.

X. Bryaceæ.

1. Orthodontium, *Schw.*

O. sulcatum, *Hook. fil. et Wils.*
Hab. Tasmania, on dead trees, West-end Rivulet, *Mr. Archer.*

2. Mielichhoferia, *Hsch.*

M. Eckloni, *Hornsch.*
Hab. Tasmania, Cheshunt, *Mr. Archer.*

3. Webera, *Hedw.*

W. nutans, *Hedw.*
Hab. Tasmania, road-side, Splitters Hill, *Mr. Archer.*

4. Bryum, *L.*

B. cæspiticium, *Hedw.*
Hab. Tasmania, Port Sorrell, *Mr. Archer.*

B. bimum, *Schreb.*
Hab. Tasmania, Cheshunt, *Mr. Archer.*

B. torquescens, *B. & S.*
Hab. Tasmania, Cheshunt, *Mr. Archer.*

B. Tasmanicum, *Hampe.*
Hab. Tasmania, Cheshunt, *Mr. Archer.*

B. Billardieri, *Schw.*
Hab. Tasmania, Cheshunt, *Mr. Archer.* Wellington Falls, *Mossman.*

B. truncorum, *Brid.*
Hab. Tasmania, Cheshunt, *Mr. Archer.*

B. dichotomum, *Hedw.* (B. atropurpureum, *Auct.*)
Hab. Tasmania, rocks, Port Sorrell, burnt ground, plains, &c., *Mr. Archer.*

B. crassum, *Hook. fil. et Wils.*
Hab. Tasmania, Saw Pit Hill, *Mr. Archer.*

B. levigatum, *Hook. fil. et Wils.*
Hab. Tasmania, Cheshunt, a few barren stems, *Mr. Archer.*

XI. Hypnaceæ.

1. Meteorium, *Brid.*

M. fulvum (*Mitten*). Ramis gracilibus flexuosis, ramulis remotis attenuatis flexuosis pinnatis, foliis subnitentibus luteis ætate fulvis patentibus e basi lata cordata alis amplexantibus hastatis sensim tenuiter acuminatis marginibus hic illic undulatis basi ad alas serrulatis superne minutissime serrulatis apicem versus integerrimis nervo brevi infra medium in carinam parvam latiusculam ultra medium exaratam evanido ramulinis minus tenuiter acuminatis distinctius serrulatis cellulis elongatis fusiformibus angustissimis distinctis minutissime papillosis sublævibus.

Hab. Australia, Victoria, Tarwin, *Dr. F. Mueller.*

A slender species, allied to the Indian *M. aureum,* but with its leaves attenuated into longer points.

2. Hypnum, *Dill.*

* *Brachythecium,* Schimp.

H. rutabulum, *L.*

Hab. Tasmania, on trees, Long Hill, *Mr. Archer.*

H. paradoxum, *Hook. fil. et Wils.*

Hab. Tasmania, Cheshunt, *Mr. Archer.*

H. campestre, *B. & S.*

Hab. Tasmania, near Woolmers, *Mr. Archer.*

H. aristatum, *Hook. fil. et Wils. Fl. Tasmanica ined.*

Hab. Tasmania, *Mr. Archer.* New Zealand, *Mr. Knight.*

In size resembling *H. Buchanani,* but in the form of its leaves allied to *H. Vaucheri* and to *H. piliferum,* and agreeing with them in the cell-structure of its leaves and rostrate operculum.

** *Rhynchostegium et Eurhynchium,* Schimp.

H. asperipes (*Mitten*). Monoicum, caule procumbente, ramis pinnatis, foliis patentibus latissime ovatis acuminatis serrulatis nervo tenui medio evanido cellulis longitudine circiter $\frac{1}{400}$ latitudine $\frac{1}{3000}$ unciæ metientibus, perichætialibus latis in acumen breve attenuatis, theca in pedunculo sub-unciali aspero oblongo-ovali horizontali, operculo longirostrato, peristomio normali.

Hab. Tasmania, Cheshunt, *Mr. Archer.*

More densely branched and with more acuminated leaves than *H. hians,* Hedw., to which in size and general appearance it is nearly allied.

H. tenuifolium, *Hedw.*

Hab. Tasmania, on stones and logs, Tent's Creek, *Mr. Archer.*

This species appears to be frequent in Tasmania and New Zealand, some of the specimens from whence agree exactly with Hedwig's figure in the 'Species Musc.'

3. Trachyloma, *Brid.*

* *Caulis simplex.*

T. subbasilaris. (Hypnum, *Hook. Musc. Exot.*)
Hab. Tasmania, *Mr. Archer.*

** *Caulis dendroideus.*

T. comosa. (Hypnum, *Schw.*)
Hab. Tasmania, on stones in rivulets, Cheshunt, *Mr. Archer.*

T. arcuata. (Hypnum, *Hedw.*; H. spininervium, *Hook. Musc. Exot.*)
Hab. Tasmania, on the ground, and on stones in the beds of rivulets, Cheshunt, *Mr. Archer.*

In this species the superior or dorsal series of leaves are smaller than those of the lateral series; but it does not follow that it is to be referred to *Rhacopilum*, as has been supposed by M. C. Müller; for in every other particular, excepting the furrowed capsule, the species of this group are remote from that genus. Bridel's genus *Trachyloma* is adopted in preference to the creation of a new one to include the species here enumerated and a few others, which, although they do not in all respects entirely agree with *T. planifolia*, yet offer no prominent character whereby they may be distinguished. The nerve which in the cauline leaves of *T. planifolia* is imperceptible, is distinct in the leaves of the ramuli, although very slender. *Trachyloma* therefore agrees in structure with *Hypnum*, but differs in habit, the branches arising from a creeping leafless (?) rhizoma.

T. Archeri (*Mitten*). Dioica, ramis erectis inferne simplicibus sparse foliosis superne ramulis patentibus distichis pulchre pinnatis plumiformibus in frondem brevem subtriangularem dispositis, foliis bifarie compressis ovato-lanceolatis acutis nervo percurrente dorso apice denticulato marginibus simpliciter serratis cellulis longitudine circiter $\frac{1}{300}$ latitudine $\frac{1}{4000}$ unciæ metientibus dorso minute papilloso punctatis, seriebus foliorum in latere dorsali minoribus sed conformibus, perichætialibus e basi late ovata tenui acuminatis erectis, theca in pedunculo vix unciali horizontali oblonga sulcata, operculo longi-curvi-rostrato, peristomio normali.
Hab. Ovens Creek, Tasmania, *Mr. Archer.*

Two or three inches in height, pale yellowish green, shining. Nearly allied to *T. arcuata*; but its branches are more regularly disposed, forming a subtriangular frond, and readily distinguished by its minutely dotted leaves and short capsule.

T. Kerrii (*Mitten*). *T. arcuatæ* similis, stipite plus minus elongato, apice ramis brevibus pinnatis in frondem brevem subrotundatum dense confertis, foliis rameis homomorphis ovatis acutis nervo tenui excurrente dorso spinoso dentato mucronatis marginibus superne breviter simpliciterque spinoso dentato cellulis angustis elongatis basi flavis

alaribus nullis, perichætiis ad basin ramorum copiosis foliis erectis e basi ovata sensim lanceolatis attenuatis superne serrulatis nervo in exterioribus obsoleto in interioribus tenuissimo infra apicem evanido, theca in pedunculo sub-unciali ovali inæquali horizontali lævi, operculo conico rostro brevi, peristomio normali.

Hab. New Zealand, near Wellington, *Stephenson.* Waikeki, *Dr. Sinclair* and *Mr. Kerr.*

Habit, size, and colour of *T. arcuata,* but with more tufted branches, and leaves not of different forms, the capsule not more than half so long, and not furrowed.

4. STEREODON, *Brid.*

* *Cupressiformes.*

† *Operculum brevirostre.*

S. cupressiformis, *Brid.*, var. Mossmani. (Hypnum Mossmanianum, *C. Müller, Bot. Zeit.* 1851, p. 565.)

Hab. Tasmania, on trees and logs, *Mr. Archer.*

If this moss were, as described by C. Müller, truly monoicous, it might be safely distinguished from *S. cupressiformis,* but male flowers are not present in any of the specimens yet examined.

S. chrysogaster (Hypnum, *C. Müller.* H. patale, *Hook. fil. et Wils.*).

Hab. Tasmania, Cheshunt, on logs, *Mr. Archer.*

†† *Operculum longirostre.*

S. curviculatus. (Hypnum, *Hook. fil. et Wils.*)

Hab. Tasmania, Cheshunt, *Mr. Archer.*

S. cyparoides, *Brid.*

Hab. Tasmania, Cheshunt, on logs, frequent, *Mr. Archer.*

S. contiguus. (Hypnum, *Hook. fil. et Wils. Fl. Tasmanica.*)

Hab. Tasmania, on logs and upon the ground, *Mr. Archer* and *Mr. Oldfield.* New Zealand, *Dr. Sinclair.*

Allied to *S. microcarpus* (Hypnum, *C. Müller*) and to *S. brachycarpus* (Hypnum, *Hampe*), but with more spicular leaves of a different outline.

S. JOLLIFFII (*Mitten*). Monoicus, *S. Loxensi* habitu staturaque similis, ramis apicibus cuspidatis, foliis patentibus laxe imbricatis ovali-ellipticis acuminatis concavis obsolete binerviis enerviisve integerrimis vel apice subserrulatis cellulis angustis elongatis alaribus utrinque tribus majoribus hyalinis, perichætialibus interioribus tribus erecto-patentibus caulinis conformibus, theca in pedunculo gracili parva ovali inclinata horizontalive, operculo rostro æquilongo, peristomio dentibus flavis processibus solidis ciliis in uno breviore coalitis in membranam ad $\frac{3}{8}$ exsertis annulo simplici.

Hab. Tasmania, on stones and the earth, Western Creek, *Mr. Archer.* New Zealand, *Jolliffe, Sinclair, Kerr.*

Very much like *S. Loxensis* (Hypnum), Hook., but with a leaf of a different form.

** *Isothecium.*

S. cochlearifolius. (Hypnum, *Schw.*)
Hab. Tasmania, on rocks, Elliott Rivulet.

S. deflexus. (Hypnum, *Wils. MSS. olim.*)
Hab. Tasmania, on the ground, rivulet at Cheshunt, and on Western Creek, *Mr. Archer.*

S. gracilis. (Isothecium, *Hook. fil. et Wils.*)
Hab. Tasmania, stones in rivulets, Jackey's Plain Creek, *Mr. Archer.*

S. ANGUSTATUS (*Mitten*). Dioicus? ramis inferne simplicibus foliis appressis superne in frondem planiusculam dendroideam dense bi- tripinnatam divisis, foliis patentibus subcompressis anguste ovali-ellipticis brevi-acuminatis acutis concavis lateralibus complicatis integerrimis breviter binervatis, ramulinis anguste ellipticis superne serrulatis, cellulis angustis omnibus conformibus, perichætialibus e basi ovata convoluta subulatis patentibus, theca in pedunculo brevi ovali horizontali, peristomio normali?
Hab. New Zealand, near Wellington, *Stephenson*; and elsewhere, *Kerr, Lyall, Knight.*

Stems one and a half to two inches in height; habit that of *S.* (*Isothecium*) *arbuscula* and *S.* (*I.*) *deflexus*, but smaller in all its parts; leaves more narrow. Only one perfect peristome has been seen, and this appears to be normal.

S. lagurus. (Leucodon, *Hook. Musc. Exot.*)
Hab. Tasmania, Cheshunt, *Mr. Archer.*

The peristome of this moss is simple by reason of the external teeth being obsolete.

S. mollis. (Leskea, *Hedw.*)
Hab. Tasmania, Cheshunt, *Mr. Archer.*

*** *Plagiothecium*, Schimp.

S. Donianus. (Hypnum Donianum, *Smith.*)
Hab. Tasmania, Cheshunt, *Mr. Archer.*

This species has been confounded with *S. denticulatus*, but in the substance of its leaves it differs.

**** *Cylindrothecium.*

S. auriculatus. (Hypnum, *Mont.*)
Hab. Tasmania, on logs, Western Creek, *Mr. Archer.*

***** *Achyrophyllum.*

Rami erecti, elongati, ramosi. *Folia* lata, nitentia, concava, paleiformia. *Theca* plicata, operculo longi-rostrato. *Florescentia* dioica.

S. acicularis. (Hypnum, *Brid.*)
Hab. Tasmania, Cheshunt, *Mr. Archer.*

S. sciuroides. (Leskea, *Hook. Musc. Exot.*)
Hab. Tasmania, trees in creeks, *Mr. Archer.*

To this group, of which *S. acicularis* is the type, belong *S. densifolius* (Hypnum, *Brid.*), from Tristan d'Acunha and New Zealand, *S. ptychocarpon* (Hypnum, *Schw.*), *S. ericoides*, and *S. Lyallii*, Mitten (Leucodon nitidus, *Hook. fil. et Wils. in Fl. New Zealand*). All these agree in habit, ramification, the red colour of their stems, and thin, pale, chaff-like leaves and plicate capsules. *S. ericoides* and *S. sciuroides* in the Fl. of New Zealand are joined with *Neckera setosa*, Hook. Musc. Exot., to form the genus *Cladomnion*; but the last-named species is in structure altogether different, and is in fact a *Spiridens*.

Achyrophyllum differs from *Hylocomium*, Schimp., in its ramification not being pinnate, and its plicate capsules. From *Plagiothecium* it differs in its leaves not being obliquely inserted and its erect stems.

5. Sauloma, *Hook. fil. et Wils.*

S. tenella, *eorund.*
Hab. Tasmania, on logs near Cheshunt, and on rocks, Jackey's Plain Creek, *Mr. Archer.*

XII. Neckeraceæ.

1. Neckera, *Hedw.*

* *Euneckera.*

N. hymenodonta, *C. Müller, Bot. Zeit.* 1851, p. 564.
Hab. Tasmania, rivulets and damp copses, on trunks and branches of trees, *Mr. Archer.*

** *Thamnium.*

N. rivalis (*Mitten*). Dioica, humilis, ramis arcuatis parce bipinnatis apice sæpe productis stoloniferis, foliis distichis patentibus spathulatis acutis nervo ultra medium evanido margine latere inferiore anguste incurvo superne serrulatis ramulinis ellipticis magis serrulatis, cellulis inferne elongatis superne ovoideis rotundatis parvis, perichætialibus e basi lata ovata brevissime nervata subulatis longe attenuatis, theca in pedunculo elongato ovali horizontali, operculo subulato rostrato, peristomio interno ciliis binis appendiculatis inter processus perforatos dentium longitudine in membrana ad ⅓ eorum longitudinis exserta.

Isothecium pumilum, *Hook. fil. et Wils. Fl. Tasm.* t. 175. f. 7.
Hab. Tasmania, on stones, copse by West End Rivulet, on rocks by rivulets and Stackhouse Falls, *Mr. Archer.*

Allied to *Omalia oblongifolia*, Hook. fil. et Wils., but larger, less densely branched, leaves acute, and peristome more developed.

XIII. Leskeaceæ.

1. Hedwigia, *Ehrh.*

H. ciliata, *Ehrh.* (Pilotrichum, Cryphæa, Dichotomaria, microcyatheum, *C. Müller, Bot. Zeit.* 1851, p. 564.)

Hab. Tasmania, on rocks, O'Farrell's Hill, *Mr. Archer.* Near Launceston, *Mossman,* No. 830.

There appears to be no appreciable difference between these and European specimens.

H. imberbis, *Spruce.*

Hab. Tasmania, Cheshunt, on rocks, *Mr. Archer.*

H. Humboldti, *Hook.*

Hab. Tasmania, Cheshunt, *Mr. Archer.*

2. Cryphæa, *Brid.*

C. Tasmanica (*Mitten*). Monoica, ramis elongatis inferne sæpe denudatis superne ramulis brevibus ut plurimum fertilibus dense approximatis, foliis patentibus orbiculari-ovatis acutis nervo sub summo apice evanido margine e medio ad apicem minutissime sed dense serrulato nullibi recurvo cellulis minutis ovoideis ad basin angustis elongatis, perichætialibus e basi ovali subulatis thecam ovatam longe superantibus, operculo convexo acuto, peristomio interno processibus angustis dentium longitudine in membrana brevissima annulo duplici.

Hab. Tasmania, on rocks, Jackey's Plain Creek, *Mr. Archer.*

More robust than *C. dilatata* or *C. Mülleri,* the margins of its leaves not recurved below, and the perichætial leaves more subulate, but of the same habit and colour.

C. crenulata (*Mitten*). Monoica, ramis pinnatis, foliis late-ovalibus acutis obtusisve concavis nervo paulo ultra medium evanido margine apice crenulato inferne recurvo cellulis minutis ovoideis basi elongatis, perichætialibus convolutis thecam paululo superantibus acuminatis apicibus erosis, theca ovali, operculo conico acuminato.

Hab. Victoria, Tarwin, *Dr. F. Mueller,* No. 107.

Habit of the branches more nearly that of *C. patens,* but closely allied to *C. dilatata,* and, like it, probably a riparial species; from this, however, it differs in the shorter nerve of the leaves, more robust habit, and more shortly acuminated perichætial leaves.

3. Trachypus, *Schw.*

T. Hornschuchii (*Mitten*). Caule repente, ramis longissimis pendulis flexuosis subpinnatim ramosis, foliis e basi cordata caulem amplexante marginibus minute crenulatis ovatis brevi-apiculatis integerrimis nervo apicem versus evanescente carinatis bistriatis e cellulis minutissimis subopacis margine pellucidioribus rotundatis areolatis, perichætialibus ovato-lanceolatis, theca in pedunculo brevi basi paraphysibus longe

exsertis ovali, operculo subulato longi-rostrato peristomio *T. nigrescentis.*

Meteorium cuspidiferum, *Tayl. MSS.; Hook. fil. et Wils. in Fl. New Zealand,* p. 101. Pilotrichum nigrescens, *Hsch. in Musc. Sieber.*

Hab. Tasmania, Cheshunt, *Mr. Archer.* New Zealand, *Messrs. Knight, Kerr, Jupp, Stephenson, Colenso,* and *Dr. Lyall.* Found also in Australia, New Holland, *Sieber,* and the Pacific Islands.

The original *Neckera cuspidifera,* Taylor, MSS., is an East Indian species, which, although very nearly resembling the present species, has its leaves narrowed from a subquadrate base, and the narrowed portion obtusely sharpened, forming a wide point; the whole plant is also much more rigid. The capsules resemble those of *T. nigrescens,* with which also the peristome, so far as has yet been observed, appears to correspond; but the form of the leaves is very different, and the whole moss generally more robust.

T. CERINUS (*Mitten*). *T. Hornschuchii* similis sed robustior, ramis ramulis copiosioribus pinnatis foliis ambitu ovatis basi cordatis alis amplexantibus serrulatis deinde sensim apicem versus angustatis apice brevi-acuminatis nervo sub apice evanido vix carinatis haud plicatis margine medio sinuato recurvo integerrimo cellulis ad marginem pallidioribus elongatis cæteris abbreviatis obscuris inferioribus pallidioribus.

Neckera cerina et N. luteola, *Taylor MSS. in Herb. Greville.* Meteorium cuspidiferum, ex parte, *Hook. fil. et Wils. in Fl. New Zealand,* p. 101.

Hab. Tasmania, on trees in creeks, *Mr. Archer.* Australia, *Mr. Bidwill* and *Dr. F. Mueller.* Also in New Zealand.

More robust than *T. Hornschuchii,* but with the same habit and pale-green or yellowish colour. The leaves have their nerve narrower and thinner, and the cells for several series at the margin are paler and elongated; by this particular, and the sinuation of the leaf about the middle, the species is easily distinguished from the preceding.

T. flexicaulis. (Pilotrichum, *Tayl. MSS.* Meteorium flexicaule, *Hook. fil. et Wils. in Fl. New Zealand,* p. 101. Pilotrichum croceum, *Hampe? in Linnæa,* 1852.)

Hab. Tasmania, *Mr. Archer.* Found also in New Zealand and in S. America on *Cinchona lancifolia.*

It is not possible to determine if M. Hampe's name belongs to this or to one of the other Tasmanian species, the description being insufficient.

4. LESKEA, *Hedw.*

L. hispida. (Hypnum, *Hook. fil. et Wils.*)

Hab. Tasmania, bank by a waterfall, fossiliferous limestone, Cheshunt, *Mr. Archer.*

L. UMBROSA (*Mitten*). Dioica, caule procumbente breviusculo vage ramoso, foliis patentibus subsecundis siccitate vix mutatis e basi paululum latiore subovata angustatis ligulari-lanceolatis apice acuminatis apiculo longiusculo nervo crassiusculo in apiculo evanido margine superne minute serrulato, cellulis minutis subobscuris diametro circiter $\frac{1}{4000}$ unciæ metientibus, perichætialibus e basi latissime ovata subulato-attenuatis nervo percurrente marginibus utrinque uni-bi-dentatis cæterum integerrimis, theca in pedunculo sub-semiunciali rubro ovali horizontali, peristomio normali.

Hab. New Zealand, *Kerr.*

Stems about one inch long, with a few irregular branches. At first sight it might readily be passed over as a small or young state of *L. hispida,* which it very nearly resembles in habit and colour, but its leaves are of a very different form.

L. FULVASTRA (*Mitten*). *L. delicatulæ* habitu statura colore ramificationeque simillima, foliis caulinis patenti-recurvis e basi late hastato-ovata acuminatis planiusculis tenuiter biplicatis nervo concolori excurrente margine hic illic crenulato vix serrulato basin versus recurvo, cellulis distinctis limitibus latiusculis rameis late cordatis acuminatis concavis subserrulatis ramulinis ovatis acutis laxe imbricatis serrulatis nervo sub apice evanido dorso breviter papillosis, perichætialibus erectis ovatis acumine lanceolato recurvo nervo tenui percurrente margine superne filis elongatis ciliato, theca in pedunculo elongato rubro cylindrica curvata inclinata, operculo subulato-rostrato, peristomio normali interno, ciliis tribus inter processus positis.

Hypnum furfurosum, *Hook. fil. et Wils. ex parte.*

Hab. New Zealand, *Col. Bolton, Kerr, Knight, Milne, Dr. F. Mueller.* Also in Tristan d'Acunha, *Milne.*

L. LÆVIUSCULA (*Mitten*). Dioica, *L. tamariscinæ* simillima, caule foliolis brevibus dense vestito, foliis ejusdem latitudinis subæquilateri-triangularibus nervo crasso concolori in acumen angustum elongatum flexuosum excurrente marginibus inferne recurvis integerrimis cellulis minutis subobscuris læviusculis rameis basi ovatis acuminatis obtusiusculis concavis ramulinisque ovato-oblongis compressis obtusis obscuris subintegerrimis minutissime papillosis sublævibus, perichætialibus erectis pallidis ovato-lanceolatis in acumen elongatum flexuosum subserrulatum attenuatis margine apicem versus partis latioris ciliato, theca in pedunculo elongato rubro cylindrica arcuata horizontali, peristomio normali.

Hab. New Zealand, near Wellington, *Stephenson.* Milford Sound, *Dr. Lyall*; and elsewhere, *Kerr.* Forests, Wairoa River, Kaipara, *Mossman,* No. 742. Cheshunt, *Mr. Archer.*

Size, habit, and colour of *L. tamariscina,* but with leaves more nearly resembling those of *L. cymbifolia* (Hypnum, *Dzy. et Molk.*), having the nerve excurrent into a long flexuose slender point, and scarcely anywhere

serrulate or papillose. The cauline and rameal leaves with longer points, the margins of the former scarcely serrulate; and the ciliated perichætial leaves suffice to distinguish this from the *L. delicatula* of the Northern hemisphere.

L. hastata. (Hypnum, *C. Müller.*)
Hab. Tasmania, on stones by rivulets, Ovens Creek, and Cumming's Head, Western Mountains, *Mr. Archer.*

5. Rhacopilum, *Brid.*

R. strumiferum, *C. Müller, Bot. Zeit.* 1851, p. 563. (R. australe, *Hook. fil. et Wils. in Fl. New Zealand.*)
Hab. Tasmania, Cheshunt, *Mr. Archer.*

R. cristatum, *Hook. fil. et Wils. in Fl. New Zealand.*
Hab. Tasmania, *Mr. Archer.*

R. lætum (*Mitten*). Dioicum? statura *R. spectabile* æmulans, læte luteo-viride, foliis ventralibus elliptico-ovatis acutis basi paululum asymmetricis dorsalibus ovatis sensim acutis nervis concoloribus in mucrones setiformes excurrentibus marginibus minute subserrulatis, cellulis ovoideis rotundatisque intermixtis distinctis lævibus pellucidis, perichætialibus erectis ovatis acuminatis, paraphysibus brevibus inclusis, theca in pedunculo elongato trigono rubro cylindracea arcuata plicata subhorizontali ore obliquo basi strumuloso, operculo subulato-rostrato, peristomio normali?, calyptra parce pilosa.
Hab. New Zealand, *Mr. Kerr* and *Dr. Sinclair.*

Intermediate in size between *R. tomentosum* and *R. spectabile,* but approaching nearest to the latter; leaves thin and less rigid than in the other New Zealand species.

XIV. Mniaceæ.

1. Fissidens, *Hedw.*

F. adiantoides, *Hedw.*
Hab. Tasmania, small island at the foot of Top Paddock, Woolmers, *Mr. Archer.* Sterile.

F. rigidulus, *Hook. fil. et Wils.*
Hab. Tasmania, Tent Rivulet, Cheshunt, on rocks, Stackhouse Falls, *Mr. Archer.*

F. tenellus, *Hook. fil. et Wils.*
Hab. Tasmania, Sandstone Hill, *Mr. Archer.*

F. Taylori, *C. Müller.* (F. pygmæus, *Taylor.*)
Hab. Tasmania, on the earth, in copses, forests, &c., Cheshunt, *Mr. Archer.*

F. pallidus, *Hook. fil. et Wils. Fl. New Zealand,* t. 83. f. 7.
Hab. Tasmania, Cataract Hill, *Mr. Archer.*

F. INTEGERRIMUS (*Mitten*). Dioicus? caule humili cæspitoso ramoso, foliis plurijugis in frondem linearem approximatis patentibus lineari-lanceolatis apice obtusiusculis nervo concolori sub apice evanido lamina vera apice ad medium producto inæquali uno latere rotundato dorsali basi sensim angustato, omnibus laminis immarginatis integerrimis cellulis diametro circiter $\frac{1}{3000}$ unciæ metientibus limitibus crassiusculis, perichætialibus conformibus, theca in pedunculo brevi apicali crassiusculo suberecta brevi ovali, operculo subulato breviore.

Hab. Tasmania, Cheshunt, *Mr. Archer.*

Half an inch high. Seta scarcely two lines long. In general appearance nearly allied to *F. pallidus,* but its leaves are entire, the cells smaller with thicker walls, male flowers absent. In the few specimens yet seen, the plants are, above brownish yellow, below black.

2. MNIOPSIS, gen. nov.

Acrocarpica. Folia cellulis hexagonis areolata. *Peristomium* externum dentibus 16; internum processibus alternantibus e membrana exsertis. *Calyptra* mitriformis parva.

M. PLUMULA (*Mitten*). Dioica, gregaria, caulibus simplicibus erectis inferne foliis minutis remotis superne majoribus in caule fertili horizontaliter insertis patentibus ovatis comalibus perichætialibusve ligulatis obtusis, in caule sterili distichis verticalibus oblongo-ovatis acutis obtusisve patentibus decurrentibus omnibus integerrimis nervo sub apice evanido cellulis hexagonis limitibus crassiusculis, theca in pedunculo bilineari gracili ovali cylindrica æquali, operculo subulato recto, peristomio externo dentibus longissimis angustis rubris siccitate incurvis cirrhatisque, interno processibus ciliiformibus brevibus in membrana brevi exserta, flore masculo fœmineo similis in caulium apicibus parvo capituliformi, antheridiis minutis brevibus, paraphysibus nullis.

Hab. Tasmania, below the quarry, Ovens Creek.

Stems from one-fourth to half an inch high, dull green, considerably resembling some small species of *Fissidens*; its affinity is, however, to *Schistostega,* with which it agrees in the vertical insertion of the leaves of its barren stems, but recedes in the presence of a rather stout nerve and the regular hexagonal cells. In the structure of its peristome it approaches to *Aulacomnion.* The calyptra is smaller in proportion than that of *Tetraphis* or *Tetrodontium.*

3. LEPTOSTOMUM, *R. Brown.*

L. inclinans, *R. Brown.* (L. flexipile, *C. Müller, Bot. Zeit.* 1851, p. 547.)
Hab. Tasmania, Cheshunt, *Mr. Archer.*

4. AULACOMNION, *Schw.*

A. Gaudichaudi. (Leptotheca, *Schw.*)

Hab. Tasmania, on rocks, The Falls, and Sandstone Hill, *Mr. Archer.* Wellington Falls, Mount Wellington, *Mossman.*

5. Hymenodon, *Hook. fil. et Wils.*

H. pilifer, *eorund.*

Hab. Tasmania, Cheshunt, *Mr. Archer.*

6. Rhizogonium, *Brid.*

R. distichum, *Brid.* (R. Mülleri, *Hampe in Plantæ Muellerianæ* !)

Hab. Tasmania, on stones by rivulets, Smith's Creek, *Mr. Archer.* Mount Wellington, *Mossman.*

R. Novæ-Hollandiæ, *Brid.*

Hab. Tasmania, on dead trees, Western Creeks and West-end Rivulet, *Mr. Archer.* Mount Wellington, *Mossman*, No. 756.

R. Hookeri, *C. Müller.* (R. Mossmanianum, *ejusd. Bot. Zeit.* 1851, p. 547.)

Hab. Tasmania, on rocks, Elliott Rivulet and elsewhere, *Mr. Archer.*

There appears to be no real difference between these two reputed species; the difference in aspect probably arises from locality. Other and larger specimens than Mossman's have been received from New Zealand.

R. spiniforme, *Brid.*

Hab. Tasmania, Cheshunt, *Mr. Archer.* Mount Wellington, *Mossman*, No. 753 part.

7. Daltonia, *Hook. et Tayl.*

D. Novæ-Zelandiæ (*Mitten*). Monoica, *D. splachnoidi* simillima, foliis elliptico-lanceolatis acuminatis, nervo sub apice evanido profunde carinatis alis convexis marginibus recurvis cellulis ovoideis basi paululum longioribus apice minoribus margine tenui inconspicuo, perichætialibus parvis ovatis, theca in pedunculo superne subscabro globoso-ovali inclinata, operculo subulato, calyptra lævi, fimbriis ad thecæ medium descendentibus.

Hab. New Zealand, ravines near Wellington, *Stephenson.*

Stems, in the very small quantity of this species yet seen, half an inch high; in other respects similar in appearance to *D. splachnoides*; but the upper part of the leaf wider, not gradually narrowed, but rather abruptly acuminated, with shortened cells and the margin recurved.

8. Mniadelphus, *C. Müller.*

M. microcarpus. (Hookeria, *Hook.*)

Hab. Tasmania, rivulets, Ovens Creek, Cheshunt, and Tent Creek, *Mr. Archer.*

M. pulchellus. (Hookeria, *Hook. fil. et Wils.*)

Hab. Tasmania, on rocks, rivulet near Cumming's Head, Western Mountains, *Mr. Archer.*

M. crispulus. (Hookeria, *Hook. fil. et Wils.*)
Hab. Tasmania, rivulet behind the Sawpit, Smith's Creek, *Mr. Archer.*

9. Pterygophyllum, *Brid.*

P. nigellum, *Hook. fil. et Wils.*
Hab. Tasmania, rocks in rivulets and creeks, *Mr. Archer.*

P. obscurum (*Mitten*). Caule bi- tri-pollicari latitudine cum foliis fere trilineari parce ramoso, foliis disticho-compressis lateralibus patentibus late elliptico-spathulatis angulo apicali obtuso basi angustatis intermediis patentibus dimidio brevioribus subtrapezoideis obtusis duobus cauli parallelis mediis dorsalibus et ventralibus erectis appressis late obovatis apice rotundatis omnibus foliorum nervo ad medium brevi-furcato evanido marginibus superioribus crenulato-serratis cellulis partis superioris circiter $\frac{1}{900}$ unciæ diametro metientibus.
Hab. Tasmania, Cheshunt, *Mr. Archer.*

Whole plant obscure blackish green. Allied to *P. denticulatum* and *P. nigellum*, but with its lateral leaves very much narrowed towards the base, and these, as well as the intermedial and medial, of a different form. The species of this genus, from neglect in the descriptions of the very different forms of their leaves in the several series, are hardly intelligible.

XV. Hypopterygiaceæ.

1. Cyathophorum, *Brid.*

C. bulbosum. (Anœctangium, *Hedw.*)
Hab. Tasmania, Cheshunt, *Mr. Archer.*

2. Hypopterygium, *Brid.*

H. Novæ-Zelandiæ, *C. Müller, Bot. Zeit.* 1851, p. 562. (H. Smithianum, *Hook. fil. et Wils. in Fl. New Zealand.*)
Hab. Tasmania, on living trees, Western Creek, and by rivulets, *Mr. Archer.*

H. Struthiopteris, *Brid.* (Lopidium pallens, *Hook. fil. et Wils. in Fl. New Zealand.*)
Hab. Tasmania, in creeks, *Mr. Archer.*

XVI. Buxbaumiaceæ.

1. Buxbaumia, *Hall.*

B. Tasmanica (*Mitten*). *B. indusiatæ* simillima, foliis parvis ciliatis, pedunculo nitido subscabro, theca suberecta ovata superficie superiore planiuscula immarginata inferiore convexa, operculo conico.
Hab. Tasmania, Cheshunt, *Mr. Archer.*

Closely resembling *B. indusiata*, but differing in its nearly smooth shining seta. Peristome apparently composed of smooth bladdery cells, scarcely free from the internal membrane. All the capsules yet seen, although fully formed, are too immature to show the perfectly developed peristome, or whether the external capsular wall rolls off as in *B. indusiata*.

XVII. Polytrichaceæ.

1. Atrichum, *Beauv.*

A. ligulatum, *Mitten.*
Hab. Tasmania, *Mr. Archer.*

This is probably the *Catharinea Mülleri*, C. Müller et Hampe, but it has not yet been compared with their description.

2. Psilopilum, *Brid.*

P. crispulum, *Hook. fil. et Wils. Fl. New Zealand*, pl. 87. f. 3.
Hab. Tasmania, Western Mountains, *Mr. Archer.*

P. australe, *Hook. fil. et Wils. l. c.*
Hab. Tasmania, on stones and on the earth, rivulet behind Cumming's Head, Western Mountains, *Mr. Archer.*

3. Pogonatum, *Brid.*

P. alpinum, *L.*
Hab. Tasmania, The Falls, and rivulet behind Cumming's Head, Western Mountains, *Mr. Archer.*

4. Polytrichadelphus, *C. Müller.*

P. Magellanicus (*L.*, emend.). Caule subsimplici vel fastigiatim ramosissimo, foliis siccitate appressis incurvis subsecundisve humidis e basi erecta convoluta subquadrata cellulis elongatis pellucidis superne in minutas incrassatas subito transeuntibus patentibus angustatis brevilineari-lanceolatis apice crassiusculo acutis lamellis obtectis margine in parte lanceolata dentatis dorso sublævibus, perichætialibus caulinis similibus vaginula pilosa, theca in pedunculo elongato inclinata horizontalive ovata bi-angulato superne plano subconcavo inferne convexo, operculo subulato, calyptra apice setulosa basi nuda vel pilis paucis vestita (*Hedw. Sp. Musc.* t. 20. fig. 1. tantum!; *Hook. fil. et Wils. Crypt. Antarct.* pl. 59. t. 3).

Catharinea (Polytrichadelphus) innovans, *C. Müller, Bot. Zeit.* 1851, p. 548.

Hab. Tasmania, Cheshunt, *Mr. Archer.* Mount Wellington, *Mossman*, No. 752; intermixed with *Polytrichum juniperinum.* Found also in New Zealand, Fuegia, and Campbell's Island.

Great confusion exists amongst the species of this group, whose capsules are inclined, bi-angular, plane or concave above and convex below, like those of *Lyellia* and *Buxbaumia*. The figure in "Hedwig Sp. Musc." fairly represents this moss, so far as relates to the entire plant; in the figure in "Crypt. Antarct." the capsules are not depicted with the two angles, and the outline of the leaf is not quite correct. M. C. Müller describes the capsule as "irregulariter 4–5 angulata," but Mossman's specimens are precisely like those from New Zealand and Fuegia. Bridel and Müller describe the perichætial leaves as cordate, but these appear to be not different in form from the cauline.

P. CROCEUS (*Mitten*). Habitu staturaque *P. Magellanici*, caule subsimplici foliis siccitate erectis appressis humidis e basi erecta convoluta oblongo-ovata inferne cellulis elongatis teneris pallidis superne in maculam obcordatam basin fere dimidiam occupante intense croceo tinctis inde subito in minutas depressas incrassatas pallide fuscas transeuntibus angustatis lanceolatis erecto-patentibus apice crassiusculo acutis lamellis obtectis margine superne dorsoque apice dentatis, perichætialibus basi longiore tenerioreque convolutis parte angustata breviore vaginula filis fuscis emergentibus pilosa, theca in pedunculo elongato inclinata oblonga bi-angulata plano convexo, operculo rostrato, calyptra glabra.

Hab. Brazil, common on clayey banks, *Gardner*, no. 12.

Leaves, when dry, more erect and appressed, and gradually narrowed from an ovate base in which the saffron-coloured spot appears to be uniformly present.

P. HORRIDUS (*Mitten*). Habitu formis communibus *P. formosi*, caule simplici, foliis rigidis siccitate vix mutatis e basi subovata erecta, convoluta, cellulis elongatis angustis subpellucidis subito superne in parvas depressas transeuntibus angustatis divaricatis lanceolatis apice sensim angustatis acutis lamellis obtectis marginibus e basi partis angustatæ dentatis erectis dorso apice parce subindistincte dentato, perichætialibus caulinis conformibus paululo angustioribus, theca in pedunculo elongato oblonga horizontali bi-angulata plano-convexa.

P. Magellanicum, *Hedw. Sp. Musc.* t. xx. fig. 2.

Hab. Hermite Island, Cape Horn, *Dr. J. D. Hooker*. Sandy Point, Magellan, *Lechler*, 1163. Falkland Islands, *Dr. J. D. Hooker* and *Lechler*, 97.

Young leaves glaucous green, the older and nearly the whole plants ferruginous, stiff, and scarcely at all altered by drying, gradually narrowed at the apex into a bristly point, not obtusish as in *P. Magellanicus*, nor so abruptly narrowed from the dilated base, but gradually narrowed from a base of a subovate form. Hedwig's fig. 2, *l. c.* excellently represents the leaves of this species; but the figure of the whole plant (fig. 1) is very different, and equally well depicts the species here understood as *P. Magellanicus*; and as both inhabit the same region, it may not be

improbable that the original specimens were intermixed. As to the remark in 'Fl. New Zealand' that *P. giganteum* and *P. longisetum* may be forms of *P. Magellanicum*, with equal justice might all the tetragonal capsuled *Polytricha* be referred to *P. commune*.

5. Polytrichum, *L.*

P. juniperinum, *Hedw.*

Hab. Tasmania, Elliott Rivulet, *Mr. Archer*; and elsewhere, *Mossman*.

P. commune, *L.*

Hab. Tasmania, Cheshunt, *Mr. Archer*.

XVIII. Sphagnaceæ.

1. Sphagnum, *Dill.*

S. cymbifolium, *Dill.*

Hab. Tasmania, *Mr. Archer*.

S. Novo-Zelandicum (*Mitten*). *S. cymbifolio* simile, caule strato unico cellularum inanarium corticato foliis obovatis lingulatis apice obtusis denticulatis marginatis basi brevi-calcaratis spatiis basi paucis inanibus cæteris repletis, ramis cellulis corticalibus inanibus foliis ovatis acuminatis apice truncatis denticulatis e serie triplici cellularum marginatis spatiis latiusculis fibrillis repletis poris singulis binis trinisve involucrantibus latissime ovalibus obtusis apice denticulatis structura rameis conformibus, theca *S. cymbifolii*.

Hab. New Zealand, *Kerr* and *Knight*.

Nearly allied to *S. cymbifolium*, and with some resemblance to *S. contortum*, but its branches not so curved, its leaves of a different form, all margined, spaces wider, and pores few in number.

S. confertum (*Mitten*). Habitu *S. compacti*, ramulis dense confertis breviusculis, caule cortice e serie cellularum triplici formato serie externo fibris repleto, foliis oblongis apice rotundatis suberosulis spatiis intercellularibus superioribus fibris repletis inferioribus inanibus margine nullo, ramulis cortice cellulis inanibus foliis ovatis concavis obtusis apice truncatis denticulatis margine serie unico cellularum angustissimarum superne minutissime serrulato spatiis latiusculis fibris spiris approximatis repletis, poris singulis.

Hab. Tasmania; Western Mountains, rivulet behind Cumming's Head, *Mr. Archer*.

Appearance and habit similar to *S. subsecundum*, but the cortical cells disposed in a triple series.

S. molliculum (*Mitten*). *S. plumoso* simile, caule cortice ex strato unico cellularum efformato, foliis sub-elliptico-ovalibus basi brevissime calcaratis apice rotundatis subtruncatis minute denticulatis spatiis intercellularibus utplurimum repletis margine e serie triplici cellularum angustissimarum composito, ramulis flaccidis cortice cellulis inanibus foliis ovatis acuminatis marginibus superne incurvis apice

cucullato-concavis rotundatis argute denticulatis marginibus ut in caulinis spatiis angustis elongatis spiris repletis, poris nullis.

Hab. Tasmania; Little Bridge's-head Creek, *Mr. Archer.*

Habit intermediate between *S. acutifolium* and *S. plumosum*, but approaching more nearly to the latter.

S. ANTARCTICUM (*Mitten*). *S. cymbifolio* simile, caule cortice e stratis tribus cellularum inanium tecto, foliis oblongis apice rotundatis, margine nullo, spatiis intercellularibus latiusculis utplurimum fibris repletis, ramulis patentibus, cortice cellulis inanibus, foliis late suborbiculari-ovatis acuminatis inferne erectis superne patentibus apice truncatis denticulatis margine angusto ex unico serie cellularum composito spatiis latiusculis longitudine in folii medio latitudinem sextuplo superantibus fibris spiris approximatis repletis, poris parvis singulis-quinisve, ramulis pendulis, foliis appressis ovatis integerrimis spatiis quatuor, sex-poriferis.

S. compactum, var. *Hook. fil. et Wils. Crypt. Antarct.* p. 122.

Hab. Campbell's Island. *Dr. J. D. Hooker.*

Rather more rigid than *S. cymbifolium*, but closely resembling it in size and appearance, differing, however, in the empty cortical cells of the stems and the margined leaves of the ramuli. From *S. compactum* it differs in the triple series of the cortical cells as well as in the form of the leaves.

S. AUSTRALE (*Mitten*). *S. cymbifolio* simile, caule seriebus circiter quinis cellularum corticato, foliis brevi-oblongis obtusis margine apicis incurvo erosulo basi calcaratis immarginatis spatiis intercellularibus inanibus, ramulis copiosis patenti-recurvis, cortice cellulis inanibus, foliis imbricatis ovatis apice latiusculis obtusis margine ex uno serie cellularum angustissimarum apicem versus remote minuteque serrulato, spatiis latis longitudine in folii medio latitudinem quadruplo superantibus fibris spiris approximatis repletis, poris parvis singulis quinisve, ramulis pendulis, foliis appressis ovato-lanceolatis obtusis, spatiis majoribus, poris circiter quinis.

S. compactum var. ovatum, *Hook. fil. et Wils. Fl. Antarct.* p. 122.

Hab. The Snugg, Huon, *Mr. Oldfield*; and in Campbell's Island, *Dr. J. D. Hooker.*

Very similar to *S. cymbifolium* and to *S. antarcticum*, but in structure allied only to the latter, from which it recedes in the form of its branch leaves. *S. compactum* is immediately distinguished from these species by its cortex being composed of a single series of cells.

S. cymbifolioides, *C. Müller, Bot. Zeit.* 1851, p. 546.

Hab. Cheshunt, Tasmania, *Mr. Archer.*

The description above quoted, according to Mossman's specimens, is incorrect, for the cauline leaves have a margin of three rows of narrow cells. In this species the cortical cells are in a single stratum, and the leaves of the ramuli have the intercellular spaces with a pore between every turn of the spiral fibre.

Observations on the Growth and Time of Appearance of some of the Marine Algæ, &c. By J. Cocks, Esq., M.D., Honorary Member of the Dublin Natural History Society. Communicated by Robert Hudson, Esq., F.R.S., F.L.S.

[Read March 3rd, 1859.]

In the course of conversation, when I was favoured last autumn with a call from Dr. Hooker accompanied by Dr. Harvey, of Trinity College, Dublin, I made some remarks on the growth and time of appearance of several species of the marine Algæ, to which these gentlemen thought I ought to give publicity. I have therefore much pleasure in availing myself of the present opportunity to contribute some additional facts to the rather limited knowledge we at present possess of a branch of natural history which, for some years past, has excited an unusual degree of interest. And, upon the threshold of this paper, I will observe that whoever adventures upon this branch of natural history with a view to follow it out to its remote conclusions, must necessarily become a practical collector.

In the course of this occupation he will observe many interesting facts, connected with the varied objects to which his attention will be especially directed, and the elucidation of which will require close and philosophical consideration.

I trust I may, without presumption, lay claim to an opinion on the subject, derivable from an experience of fifteen years, during which period I have almost exclusively devoted my time and attention to its pursuit. I have not only carefully examined the vicinity of Plymouth, so rich in marine Algæ, but I have with equal attention extended my researches for several miles both to the eastward and westward of the same place.

In the year 1855 I commenced the publication of the 'Algarum Fasciculi;' and since that period my explorations of the harbour and the coasts have been continuously and carefully repeated, *over and over again*, because it became imperatively necessary that I should provide myself with at least 700 specimens, including ten different species of Algæ, every consecutive two months. In order to accomplish this, it became necessary that I should traverse and examine a large extent of the shores in the neighbourhood.

Whilst engaged in this laborious occupation, which nothing but zeal born of love for the pursuit could have enabled me to carry out at this advanced period of my life, my attention was forcibly drawn, not only to the growth, but also to the period of the

reappearance of many species of marine plants; I at length discovered that in this respect a very remarkable difference exists between these and land-plants.

For instance:—dating from the period when I first became a collector, I ascertained that many of the plants which I originally found growing in certain localities did not invariably reappear under the same circumstances; that is to say, they either disappeared altogether, or remained in abeyance during the lapse of a series of seasons; whilst, in contrast, I found the same plants growing in quite a new and different locality. I observed also that there were a few species which I never found growing but in the very spots where they were originally discovered; for instance, the "*Griffithsia secundiflora*," which was first found by my friend the Rev. Mr. Hore growing near Bovisand in 1846, where I have since been in the habit of taking it myself for many succeeding years, occurs, I believe, in no other place in Great Britain. I would also remark that, although I have visited this locality at all periods throughout the year, with the exception of three of the winter months, I have never yet found a single specimen of this plant in fruit; but I am nevertheless inclined to believe that, if specimens could be taken in December, January, and February, they would be found to be in a state of fructification. The impediments are, however, very great. The place in which it grows is difficult of approach, even at the most favourable times, and then only in a boat. Whenever the wind blows from the south-west, or when the sea is rough, it is entirely unapproachable; and besides, on reaching the spot, it is invariably found growing submerged to the depth of three or four feet at the lowest spring-tides.

In the years 1844 and 1845, I was fortunate in collecting some very large and beautiful plants of *Callithamnion roseum*—not an uncommon species. Since that period I have not succeeded in taking any so fine, and for the last three years I have not been able to secure a single good specimen. It is, however, rather remarkable that in the spring of last year (1858) a curious variety of this plant, which I had never before seen, made its appearance. It was found growing in singular abundance, and in several different localities; and although I examined many hundreds of specimens, I did not succeed in finding a single one in a state of fructification. In the year 1849 I found another species belonging to the same genus, viz. a remarkably slender variety of *Callithamnion pedicellatum*, growing in luxuriant abun-

dance near the ballast-pond at Torpoint, since which time this variety of the plant has entirely disappeared.

In the same year, the Rev. Mr. Hore and myself found several specimens of that very rare and curious plant, *Carpomitra Cabreræ,* washed up on the shores of Mount Edgecumbe. Singular to relate, an interval of sixteen years had elapsed, and not a single specimen, save these, had been taken since the solitary one that was found by Miss Ball on the south coast of Ireland; and as previously to that occurrence no other specimen had been taken, Dr. Harvey has remarked, in his 'Phycologia Britannica,' that "this interesting plant is not truly the growth of our own shores, but has been wafted hither, as other European productions sometimes are, by the influence of currents." This surmise, however, proved to be incorrect, as both Mr. Hore and myself, since our first meeting with this plant, have on various occasions found it washed up on the shore at Mount Edgecumbe, and also at Torpoint. In the autumn of the years 1856 and 1857, I succeeded in dredging some very fine specimens, growing in seven fathoms of water in Plymouth Sound.

In the month of October 1847, I picked up my first specimen of that very rare and interesting plant, *Stenogramme interrupta,* amongst rejectamenta on the shore of Bovisand, near Plymouth, —a plant which had never before been taken in Great Britain, or perhaps in Europe. In the year 1849, and at various periods since, many other specimens have been found washed up on the shore. Latterly, however, I have taken with the dredge fine specimens of this plant, all growing on stones in six or seven fathoms of water. Some years after my first discovery of the *Stenogramme,* it has been dredged by Mr. Isaac Carrol in Cork Harbour. Miss Gifford has also found specimens washed on shore near Minehead in Somersetshire; but those I have seen from that locality are much broader in the fronds than those taken at Plymouth.

Gigartina pistillata, also a rare species, had not been found in Great Britain since the year 1829, when in 1851 it was rediscovered by my friend Mr. Gilbert Sanders, of Dublin, growing at Whitsand Bay, near Plymouth. I have since, on various occasions, secured other specimens of this plant, and always in the same locality, but I do not think any of them were so fine as those which were taken by Mr. Sanders.

When out collecting with Dr. J. W. Budd, of Plymouth, in the month of June 1854, we found growing in an obscure place amongst the rocks in Firestone Bay, Plymouth, which was only

approachable by a boat, a good many specimens of *Chrysymenia rosea*,—a plant which had never before been taken in Devon or Cornwall, a few only having been gathered by Mrs. Hayden and Mrs. Gattey in the year 1850 at Filey, on the Yorkshire coast. In the year following the one in which Dr. Budd and myself took our specimens, we found others growing in the same place; but afterwards they entirely disappeared from that habitat, though many other specimens have subsequently been found in several different localities, and, amongst others, growing on the mooring-buoys in the Sound.

Again, in the years 1850 and 1851 a considerable number of specimens of that rather scarce plant, *Microcladia glandulosa*, were washed up with other rejectamenta upon the beach under the Plymouth citadel. These were all growing parasitically upon the fronds of *Nitophyllum laceratum* and *Rhodymenia laciniata*. Since that time no other specimens have been taken in this neighbourhood, although the above-named plants on which they grew are still found as abundantly as ever.

A still more singular occurrence remains to be noticed, viz. that of a single specimen being found of a species for which, from the first moment I became a collector until then, I had been diligently seeking, and which had also been carefully sought for, many years previously, by Mr. Hore, without success. I allude to *Codium Bursa*, a single plant of which I discovered growing on one of the mooring-buoys in Plymouth Harbour; and although at the same time and subsequently I have examined all the buoys in the Sound as well as in the harbour, I have never found another.

How then are the irregularities in reference to the time of appearance, as well as the disappearance of the plants I have before alluded to, to be explained? We know that the fructification of the marine Algæ takes place with regularity; that is, the tetraspores when arrived at maturity burst, and the spores are liberated, which are carried by currents to places where they attach themselves to some substance, and in due time vegetate and produce perfect plants, similar to those from which they originated. Such being the case, although many of the plants enumerated in this paper have disappeared from their accustomed localities, yet it appears very strange, and difficult to explain why, they have not been found growing in other places, or washed on shore with other rejectamenta.

These observations will, in part, tend to show, as I have before remarked, that the growth and periods of the appearance and re-

appearance of marine plants are not so uniformly ordered as in the instance of those plants that grow upon the land. They will also compel us to admit the uncertainties that at present surround our limited knowledge of the economy and growth of the marine Algæ.

I have now to record a circumstance referring to the growth of some of the coarser species of Algæ, such as the *Laminariæ* and *Fuci*, the result of my own observation, which, if I may be allowed to hazard an opinion, may partially account for the disappearance of many of the filamentous species from their original habitats.

For the last three or four years I have observed in various places on the shore a gradual advance towards low-water mark, of the common *Fucus serratus* and *F. vesiculosus*. On the other hand, I have also observed that the *Laminariæ*, whose growth is in deep water, have been encroaching on the shore, and are now to be found in much shallower depths. The growth of these plants from two opposite positions towards one common neutral ground has had the effect of leaving very little or no intermediate space for the growth of other Algæ, as it was in this space (namely, between the tidal limits) that a great many of the filamentous Algæ, as well as many other species, were usually found growing. To my own personal knowledge these facts are comparatively new; and I am not aware that a similar eccentricity of growth has been remarked by naturalists in other portions of the English coast.

I trust, however, the knowledge of these peculiarities will stimulate the zealous algologist to watch with greater care the economy and growth of marine plants; for it is only by a studious observation of them, and an industrious exploration of their habitats, that we can hope to establish an intimate acquaintance with this very interesting branch of natural history.

In conclusion, the votaries of algology must always, by reason of the force of circumstances, be divided into two classes; for all cannot live upon the sea-coast, nor can all pay periodical visits to it. To those who can do so may be offered the privilege of contributing to the species already known, by the discovery of something that is new. They will, by this means, not only add to the gratification of those who are less happily circumstanced, but will confer upon themselves the pleasure of acquiring fresh knowledge from a new page in the great volume of Creation.

Præcursores ad Floram Indicam.—Balsamineæ. By J. D. Hooker, M.D., F.R.S., L.S. &c. and T. Thomson, M.D., F.R.S., L.S. &c.

[Read June 16th, 1859.]

This Order, as is well known, attains its maximum development in India, and it there presents a vast assemblage of forms, all but one of which strictly belong to the genus *Impatiens*.

It is often the case that when a genus is in a striking degree local, its species are to a considerable extent well marked and easily defined: such, however, is not the case with *Impatiens*; for it would be difficult to indicate another genus in the vegetable kingdom, presenting amongst its species so many and such different modifications of structure, and of which the species are so universally and so excessively prone to vary.

We commenced the study of the genus several years ago, with nearly 100 species, fully 2000 good specimens, from all parts of India, and engravings or original coloured drawings, with analyses, of upwards of fifty. On surveying these materials for the first time, we were struck no less with the prominence of the natural groups into which most of the species appeared to arrange themselves, than with the marked contrasts in the form and colour of the floral organs of many of the species; and the accessibility and apparent feasibility of these characters were so obvious, that we congratulated ourselves on the prospect of making natural and well-defined groups of the majority of the species at any rate. A little further examination of these seemingly objective groups sufficed to dispel the illusion; and after three different earnest attempts to master the genus, at intervals of several years, and with the aid of many more specimens received since we commenced the task, we have now just risen from what must be for the present the final effort, with a feeling of great dissatisfaction with the results obtained, whether as to grouping or limiting the species.

There are only two obvious and well-limited divisions of *Impatiens*:—1. The *Scapigeræ*, with tuberous perennial rhizomes (apparent roots), from which all the leaves immediately spring, and long scapes with short terminal racemes of flowers; and 2. The *Caulescentes*. Were both these divisions comprehensive, the facility of recognizing them would have materially aided the systematic study of the species; but it is not so: the acaulescent consists of five (or perhaps but three good) species, and is so singularly confined in geographical area (the western peninsular

mountains and Ceylon), that practically it is of little aid in assisting either the student or the systematist.

The caulescent group presents a number of inosculating subdivisions, of which we have adopted six, founded primarily on the habit and foliation of the species. This has often obliged us to separate plants that are very closely related indeed, and even more often to refer species of more dubious affinity to one or other group in an arbitrary manner. As it is, we have chosen what we take to be the lesser evil, and only after vainly attempting to group the species better by various combinations of the following important structural peculiarities:—

1. The seeds, which are numerous or few, with the testa polished, granulate, reticulate, pustulate, or almost villous. These afford excellent characters, but often not available in herbarium specimens; and similar seeds sometimes occur in plants of very different habit and floral structure.

2. The capsules, short, broadly elliptic, acute at both ends; or narrow, terete, or club-shaped, also afford excellent characters.

3. The form of the two combined lateral petals (called by Edgeworth and by us *alæ*), which an inspection of the garden Balsam, and of the Indian species in a living state, shows to be extremely variable. In some these are long and pendulous, in others they project horizontally and laterally; the length of the posticous lobes of each ala varies extremely, and even in the same species (*I. leptoceras* and others), it may itself vary from almost undivided to manifestly three-lobed. In *I. tingens*, Edgw., one lobe is developed in æstivation within the spur.

4. The anticous petal (*vexillum*, Edgw.) may be erect or projecting, flat or arched, entire or bilobed, keeled, cristate, or even spurred down the mesial line of the back, the spur sometimes terminating in a clavate gland (*I. racemosa*, var. *polyceras*). Great variation of this dorsal appendage in one species is exemplified by many.

5. The posticous or spurred sepal, called by us *labellum* (by Edgeworth *galea*), undergoes very many modifications in the genus, from a broad slightly concave lamina (*I. scabrida, tuberculata*, &c.) to a funnel-shaped organ with a very long spur (*I. leptoceras* and many others), a cornucopia (*I. longicornu*), a blunt straight sac (*I. Walkeræ, Jerdoniæ*, &c.), or a sac with a longer or shorter spur. This sepal is the most deceptive of all as affording characters: in *I. longicornu* it varies from a mere cone to a broad deep sac with an abrupt spur; in some of the section *Oppositi-*

foliæ we suspect that it is spurred or muticous in the same species, though, in the present condition of synonymy, we have often been obliged to accept such modifications as of specific value. The spur itself may be straight or curved or spiral, ascending or descending (according to the position of the flower), attenuate or inflated, or clavate or saccate, being sometimes variable in these respects in the same species.

6. The lateral sepals may be two or four, the two posticous alone (those next the labellum) being invariably present and tolerably constant in form; the two anticous, first observed by Edgeworth, may be present or absent in the same species, and are often reduced to papillæ or glands. The apices of the sepals (as of the dorsal spur of the vexillum) are often glandular. The relative size of the sepals and petals offers too often a very fallacious character, depending primarily on conditions of flowering.

7. The form of the flower may be flat—that is, with the laminæ of the vexillum, alæ, and even of the labellum, all in the same plane; or the whole flower may be concave, from the concavity and prominence of the vexillum and labellum especially, which (as in *I. macrophylla*) may greatly exceed the alæ, and, appearing to confine these, give them a vertical direction.

8. The colour of the flower is very variable in many of the species; yellow and purple are the prevailing colours, the former passing through ochreous, &c., into a dull red, and the latter through pink, &c., into white. In many, the flowers are spotted, the yellow with various shades of red or purple, and the purple with darker spots or blotches. In *I. racemosa* and its allies, the yellow and pale purple are mixed, and we find the same species with wholly yellow and with dirty purple flowers. For extreme variation of colour in one species, we would cite *I. longicornu* and *leptoceras*; for intensity of colour, *I. janthina* and *racemulosa*.

9. The inflorescence is always lateral, though apparently terminal in the *Scapigeræ* and in some of the *Racemosæ*. The peduncle is solitary in many, fascicled and axillary in most of the *Lateriflore*. The peduncles are 1-flowered in some, 2- or many-flowered in others; solitary in some, and fascicled in others. The species with normally fascicled 1-flowered peduncles have sometimes the fascicles reduced to one peduncle; and the species with 2- or more-flowered fascicled peduncles present sometimes 1-flowered fascicled peduncles, or even solitary 1-flowered peduncles. This leads to great confusion and an inosculation of some species (or individuals) in all the groups with alternate leaves, which we have been

unable to avoid. The position of the bracts must in all cases be referred to in order to determine the real condition of the inflorescence, though not necessarily to find the place of the plant in our system; for we are obliged to place a species with two 1-flowered axillary peduncles, bracteate at the base, in a different section from another with a solitary 2-flowered peduncle, bracteate at the ramification, however closely allied they may be in every other respect. A more awkward fact still, is that both these modifications may occur in the same species, sometimes in the same specimen.

An equally perplexing combination of discordant characters is afforded by the ramification of the peduncle itself, the inflorescence being racemose, interruptedly so, whorled and corymbose, or even umbellate through the reduction of the racemose or verticillate inflorescence. Numerous examples of several of these modifications in one species, or even specimen, may be found in the groups *Subverticillatæ*, *Umbellatæ*, and *Racemosæ*.

10. The foliation may be wholly basal (radical), as in the *Scapigeræ*; wholly opposite, as in most of the *Oppositifoliæ*; wholly alternate, as in most of the *Racemosæ*; wholly (or almost) verticillate or ternate, as in *I. Griffithii* and *I. Gardneriana*; opposite below and alternate above, as in *I. amplexicaulis*, *I. latifolia*, and *I. Thomsoni*; opposite below and ternately verticillate above, as in *I. flavida*; verticillate in the middle and opposite or alternate above and below, as in *I. trilobata*, *I. salicifolia*, and sometimes in *I. latifolia*. *I. multiflora* and *I. trilobata* are very puzzling species, being sometimes opposite-leaved throughout the whole individual, at others as constantly alternate, and others having some of the leaves ternate. The base (in form—acute, rounded, or cordate) and petiolation of the leaf are extremely variable in individual species; of the former we may instance *I. repens* and *I. scapiflora*; of the latter, *I. insignis*, *I. leptoceras*, and many others.

For the most part the foliage is glabrous; it is sparsely hairy in a good many, pubescent in a few, tomentose or hirsute in still fewer, villous or glandular on the surface in none. The margin is often serrate or duplicate-serrate, with gland-tipped lobules, and is armed at the base and on the petiole with stipitate glands, which are always very variable in number, position, and form in each species. No species has stipules properly so called; but many have large glands, solitary or fascicled, sessile or stipitate, at the bases of the petioles on the stem.

11. The stems of Balsams are annual or perennial; or more often

they have perennial rhizomes and annual branches; a few are suffruticose, having woody stems and annual branches. The axis presents numerous modifications of habit, consistence, surface, and extension. Some of the largest suffruticose species (*I. Jurpia, fruticosa*, &c.) attain 5 feet in height—and perhaps much more—resembling acanthaceous bushes in their half-shrubby character and tumid nodes; the scapigerous section has been already mentioned; another equally remarkable set of species, as regards their stems, includes the succulent-jointed epiphytic peninsular species, *I. Jerdoniæ, viridiflora*, &c.

The morphology of the flower of *Impatiens* has occupied the attention of many observers, who have taken different views of the real nature of the pieces of the perianth; we coincide with the view taken by Roeper*, Edgeworth†, and Henfrey‡, and which we have ourselves confirmed from numerous observations on the living species. There are three independent methods of obtaining proof of this view; and they all appear to us to give the same result: they are the following:—

1. Seeking amongst the species for those with the fullest complement of organs, and ascertaining the position and value of the supernumerary ones.—The existence of species with four lateral sepals was first indicated by Edgeworth, who has pointed out that they are figured in the plate of *I. glanduligera* (*I. Roylei*, Walp.) in Royle's 'Illustrations,' who, moreover, detected them in other species, *I. amplexicaulis*, &c., and first discerned their significance. We may add *I. longipes, urticifolia, leptoceras*, var. η, *sulcata, sabrida*, and *arguta* as also having four sepals, but not constantly.

2. Comparison with a closely allied genus which presents a different modification of perianth,—as *Hydroceras*, which at once explains *Impatiens*.

3. Examination of the relative positions, &c., of the parts in single and double flowers, with one another and with the axis—the course pursued by Mr. Henfrey.

All these methods lead to the same result, and appear to us to prove that the flower of *Impatiens* consists of a calyx of three (or more rarely five) sepals, of which the two supernumerary are always smallest and next the axis; the two next always green, and small as compared with the petals and the odd one, or that away from the axis, which is usually coloured and spurred. The corolla consists of one erect, often bifid or emarginate petal next the axis,

* Linnæa, ix. 921.

† Linn. Trans. xx. 37.

‡ Linn. Journ. Bot.

and four others combined in pairs and irregular in form. To save verbiage and periphrasis, we have, in the descriptions, called the two small lateral sepals only the "sepals;" the spurred one we call "labellum," the petal next the axis "vexillum," and the combined lateral petals "alæ."

The geographical distribution of the Balsams is on the whole singularly circumscribed: with the exception of the very few Siberian and European species, none extend to the north or north-west much beyond Kashmir; one only is found in Affghanistan (*I. Lemanni*). The species gradually increase in number, proceeding south-eastwards from Kashmir to Khasia and the peninsula of India, in about the following proportion:—

Kashmir, Kishtwar, and countries west of Sutlej ...	10
Sutlej to Nepal frontier	13
Nepal, Sikkim, and Bhotan	25
Khasia Mountains	21
Malay peninsula	8
Western peninsula	41
Ceylon	18

Only three of the Indian species are found in other parts of the world.

The distribution of the extra-Indian species is:—

Europe and Siberia	3
North America	2
Malay Islands, Philippines, and China	8 ?
Tropical Africa and Madagascar	8 ?
Extra-tropical South Africa	1

Numerous species will yet be detected in Madagascar and tropical Africa, and probably others in Western China and Birma. With regard to the distribution of the groups, the *Scapigeræ* are wholly peninsular and Ceylonese; the *Oppositifoliæ* almost exclusively peninsular, the *Umbellatæ*, &c., chiefly so; the *Lateriflora* and *Racemosæ* chiefly Himalayan and Khasian.

Again, of these countries the western peninsula presents the most peculiar species, only one-eighth of its species being found in other countries. The Himalaya ranks next in this point of view, two-fifths of its species being found in other countries. The Khasia mountain species, on the other hand, are chiefly Himalayan, with a few peninsular, two-thirds of its species being found in other countries. One-half the Malayan species are found in the western peninsula, and two-ninths of the Ceylon.

We add a key to the species, arranged under their countries, but have little confidence in its proving a certain guide to determining them systematically,—our object in this, as with the other Præcursores, being to bring together all the available matter regarding each genus, rather than to present it in a completely elaborated systematic form*.

CONSPECTUS SECTIONUM.

A. SCAPIGERÆ. *Rhizoma* breve, perenne. *Folia* omnia radicalia. *Scapus* gracilis, apice racemifer.—(*Bracteæ* patentes pedicellis multo breviores, carnosulæ. *Pedicelli* graciles. *Sepala* latiuscula. *Labellum* saccatum v. calcaratum. *Alæ* 2–3-lobæ. *Vexillum* fornicatum. *Capsula* late elliptico-oblonga v. lanceolata. *Semina* pustulata, minima.) (Sp. 1–5.)

A perfectly natural group, and readily recognized, confined to the western peninsula and Ceylon.

B. OPPOSITIFOLIÆ. Annuæ. *Folia* omnia opposita v. in paucis alia opposita, alia ternatim verticillata. *Pedicelli* solitarii v. fasciculati, uniflores, rarissime (in *I. salicifolia*) 2-flores.—(*Sepala* angusta, labello plerisque concavo calcarato v. mutico, rarissime saccato. *Vexillum* sæpius breve. *Alæ* non caudatæ. *Capsula* brevis, medio turgida, utrinque attenuata, in *I. Kleinii* solum subcylindrica et *I. salicifolia* clavata. *Semina* magna, testa lævissima.) (Sp. 6–20.)

For the most part a very natural group. *I. salicifolia* is the chief exception, its 2-flowered states being referable to D. Many of the species are very doubtful, and the synonymy is confused, the original specimens being in many cases bad, or badly named in Herbaria. The *I. pendula* and *Mysorensis*, though alternate-leaved, should naturally come into this group; and single-flowered, opposite-leaved specimens of *leptopoda* ?, *radicans*, and others of C may be referred to it.

C. SUBVERTICILLATÆ. *Folia* omnia subopposita, v. inferiora alterna, superiora opposita v. verticillata. *Pedunculi* 1–∞ -flores. (Sp. 21–33.)

A very artificial group, divisible into those with one-, and those with two- or more-flowered peduncles. Occasional specimens of

* Whilst these pages were passing through the press, a Number of the 'Madras Journal of Science' (Sept. 1858) has been announced, containing an important paper by Lieut. Beddome on the Peninsular species, to which I shall refer at the end of this monograph.—J. D. H., Kew, Nov. 10th, 1859.

several having all the leaves opposite may be referred to B, and others with them all alternate to D, E, F, and G. There are great difficulties attending the discrimination of the allies of *I. latifolia*, *Roylei*, and *sulcata*. *I. Goughii* may be referred to *Umbellatæ* or *Lateriflorœ*, or even to *Racemosæ*.

D. UNIFLORÆ. *Folia* omnia alterna. *Pedunculi* 1-flori. (Sp. 34–47.)

Another rather artificial assemblage, of which I suspect only a few (*I. Balsamina*, *scabriuscula*) have invariably 1-flowered peduncles, and of which the others, when 2-flowered, may be referred to E. *I. leptopoda* is probably a state of *I. latifolia*. *I. capillipes* is a curious species, very unlike the others.

E. LATERIFLORÆ. *Folia* omnia alterna, subdistantia, non omnia approximata v. subverticillata. *Pedunculi* solitarii v. fasciculati bracteolati, secus caulem elongatam plerumque axillares (non axillis supremis tantum siti), patentes, 2–6-flores. *Flores* racemosi, non umbellati. (Sp. 48–64.)

A very natural group, if confined to those species which, like *I. macrophylla*, *glandulifera*, *serrata*, *scabrida*, &c., have elongated stems and peduncles from axils of many of the rather distant leaves; but with regard to the others, several of them present specimens which fall naturally into G, and others when 1-flowered would be sought for in D. The group is divisible into several sections.

F. UMBELLATÆ et CAPITATÆ. *Folia* omnia alterna, versus apicem caulis conferta. *Flores* apices versus pedunculi elongati brevissime racemosi v. umbellati v. corymbosi.—(Bracteæ plerisque conspicuæ.) (Sp. 65–78.)

This group embraces certain closely allied peninsular species with simple stems and very short, many-flowered inflorescence, of which *I. linearis* and *umbellata* are types; but others are branched and few-flowered, as *I. grandis*, *campanulata*, &c., and may be referred to E.

G. RACEMOSÆ. *Folia* omnia alterna. *Pedunculi* plures, elongati, multiflori, demum folio longiores. *Flores* racemosi, interdum verticillati, v. fasciculati. (Sp. 80–95.)

A very natural group on the whole, the principal exceptions being *I. longicornu* and *I. urticifolia*, some forms of which may be referred to E; *I. Walkeri* is closely allied to *I. Jerdoniæ*; *I. cornigera* to certain species in F.

CONSPECTUS SPECIERUM. (* denotat species non endemicas.)

I. Malayanæ.

§ B 1. *I. chinensis (no. 6). *Fol.* oppos. subsessil. *Fl.* majusculi longe calcarati.

2. *I. oppositifolia (no. 7). *Fol.* oppos. brevi-petiol. angusta. *Fl.* parvi breve calcarati.

3. I. circæoides (no. 32). *Fol.* oppos. longe petiolata. *Fl.* parvi breve calcarati.

4. I. Griffithii (no. 8). *Fol.* terna. *Fl.* majusc.

§ D 5. *I. Balsamina (no. 34). *Fol.* angusta, grosse serrata. *Fl.* longe calcarati.

6. *I. flaccida (no. 45). *Fol.* lata. *Fl.* longe calcarati.

7. I. capillipes (no. 49). *Fol.* angusta, crenata. *Fl.* brevi-calcarati.

§ F 8. I. Tavoyana (no. 79). *Fol.* petiolata, ovata. *Fl.* parvi.

II. Ceylon.

§ A 1. *I. acaulis (no. 3).

§ B 2. *I. oppositifolia (no. 7).

§ C 3. *I. latifolia, *L.* (no. 20).

§ D 4. *I. Balsamina (no. 34). Erecta. *Fol.* angust. *Fl.* longe calcarati.

5. I. repens (no. 38). Repens. *Fol.* long. pet. *Fl.* flavi brevi-calcar.

6. I. leptopoda (no. 39). Erecta. *Fol.* ampla. *Fl.* majuscul. pall. *Calc.* gracile.

7. I. truncata (no. 40). Erecta. *Fol.* membranacea. *Fl.* parvi. *Calc.* breve.

8. I. Hensloviana (no. 47). Erecta. *Fol.* ampl. pubesc. *Fl.* maximi albi. *Calc.* longiss.

9. I. macrophylla (no. 37). Erecta. *Fol.* maxima. *Fl.* medioc. fasciculati, alis exsertis. *Calc.* breve.

10. I. glandulifera (no. 36). Erecta. *Fol.* maxima. *Fl.* medioc. fasciculati, alis minimis inclusis. *Calc.* breve.

§ F 11. I. janthina (no. 66). *Fol.* 1–2. *Fl.* violacei.

12. I. linearis (no. 68). *Fol.* angust. *Fl.* pallidi. *Calc.* breviss.

13. I. appendiculata (no. 69). Simplex. *Fol.* ovato-lanc. *Fl.* pallid. *Calc.* breve.

14. I. leucantha, *Thw.* (no. 67). Simplex. *Fol.* lanceol. *Fl.* alb. *Calc.* conicum rectum.

15. I. subcordata (no. 71). Simplex. *Fol.* ovat.-lanc. *Fl.* alb. *Calc.* gracile.

16. I. Hookeriana (no. 75). Fruticosa, ramosa. *Fol.* oval. *Fl.* magni. *Calc.* magnum.

§ G 17. I. Walkeri (no. 84). *Fl.* rubri. *Labellum* longe saccatum.

18. I. elongata (no. 85). *Fl.* rubri. *Labellum* gracile, calcaratum.

19. I. cornigera (no. 86). *Fl.* flavi. *Labellum* calcari mediocri apice incurvo.

III. Peninsulæ Occidentalis (Malabar, &c.).

§ A 1. I. scapiflora (no. 1). *Fol.* glabra. *Calc.* mediocr. incurvum.
2. I. modesta (no. 2). *Fol.* pilosa. *Calc.* mediocr. incurvum.
3. *I. acaulis (no. 3). *Fol.* orbicul. *Calc.* gracillimum.
4. I. rivalis (no. 4). *Fol.* ovat.-oblong. *Calc.* gracillimum.
5. I. Stocksii (no. 5). *Fol.* late ovat. *Calc.* 0.

§ B 6. I. Gardneriana (no. 9). *Fol.* terna.
7. I. inconspicua (no. 14). *Fol.* opposita. *Fl.* minuti, ecalcarati.
8. I. Lawii (no. 13). *Fl.* ampli, ecalcarati.
9. *I. chinensis (no. 6). *Fol.* stipulata, subsessilia. *Fl.* magni. *Calc.* filiforme.
10. I. diversifolia (no. 12). *Fol.* exstipulata. *Fl.* mediocres. *Calc.* filiforme. *Caps.* brevis.
11. I. Kleinii (no. 15). *Fl.* minimi. *Calc.* filiforme. *Caps.* linearis.
12. I. setosa (no. 16). *Fl.* magni. *Calc.* filiforme. *Fol.* stipul. longe petiolata.
13. I. rufescens (no. 10). *Calc.* breve. *Fl.* mediocres, rubri, pubescentes.
14. I. Dalzellii (no. 18). *Calc.* breve. *Fl.* flavi, majusculi.
15. I. tenella (no. 17). *Calc.* breve. *Fl.* minimi.
16. I. tomentosa (no. 11). *Calc.* breve. *Fl.* mediocr. pubesc.
17. *I. oppositifolia (no. 7). *Calc.* breve. *Fl.* majusc. glabri. Folia stipulata.

Pedunculi 1-flores.

§ C 18. *I. latifolia (no. 20). Herbacea. *Fol.* suboppos. et verticillat. *Fl.* ampli.
19. I. lucida (no. 21). Herbacea. *Fol.* opposit. membran. *Fl.* minores.
20. I. Leschenaultii (no. 22). Robusta. *Fol.* opposita, rigida.

Pedunculi 2–6-flores.

21. I. verticillata (no. 31). Herbacea. *Fol.* verticillat. *Fl.* majusc.
22. I. Goughii (no. 33). Debilis. *Fol.* opposit. *Fl.* parvi.

§ D 23. *I. Balsamina (no. 34). Glabrata. *Fol.* angusta. *Calc.* gracile.
24. I. scabriuscula (no. 35). Puberula. *Fol.* angust. *Calc.* breviss.
25. I. pendula (no. 41). Parvula, pilosula. *Fl.* minimi. *Calc.* 0.
26. I. Mysorensis (no. 42). Parvula, glaberr. *Fl.* minim. *Calc.* breve.
27. I. Munronii (no. 43). Pubescens. *Fl.* purpurei. *Sepala* magna. *Calc.* conicum, hamatum.
28. I. dasysperma (no. 44). Glabra. *Sepala* parva. *Calc.* gracile.
29. *I. flaccida (no. 45). Glaberr. *Fl.* medioc. *Sepala* parva. *Calc.* gracillimum.
30. I. pulcherrima (no. 46). Glabra. *Fl.* maxim. *Sepala* minuta. *Calc.* longiss. gracillimum.
31. I. Hensloviana (no. 47). Suffrutic. pubescens. *Sepala* ampla. *Fl.* magni. *Calc.* gracile.

§ E 32. I. fruticosa (no. 59). Elata, fruticosa. *Fl.* ampli. *Calc.* gracile.

33. I. Jerdoniæ (no. 62). Humilis, crassa. *Sepala* parva. *Labell.* longe saccatum.

34. I. auriculata (no. 63). Humilis, crassa. *Sepala* maxima. *Labell.* longe saccatum.

35. I. viridiflora (no. 64). Humilis, crassa. *Sepala* parva. *Labell.* conicum, calare incurvo.

§ F 36. I. umbellata (no. 70). Simplex. *Fol.* subverticill., brevi-petiol. *Calc.* gracile.

37. I. uncinata (no. 72). Simplex. *Fol.* longe petiol. *Calc.* breve, incurvum.

38. I. viscida (no. 73). Ramosa. *Fol.* longe petiol. *Pedunc.* viscid. *Calc.* gracile.

39. I. grandis (no. 76). Robusta. *Bract.* magn. *Fl.* maxim. *Calc.* elongat. gracile.

40. I. campanulata (no. 77). Fruticosa. *Bract.* magn. *Fl.* margin. *Calc.* perbreve, incurvum.

§ G 41. I. maculata (no. 83).

IV. Mont. Khasia, Silhet, &c.

§ B 1. *I. chinensis (no. 6). Simplex. *Fol.* opposita, brevi-petiol. *Calc.* gracile.

2. I. salicifolia (no. 19). Ramosa. *Fol.* opposit. et tern. brevi-petiol. *Calc.* breve.

§ C 3. *I. multiflora (no. 23). Elata, ramosa. *Fol.* opp. tern. et alt. longe petiol. *Pedunc.* 1-flori.

4. I. radicans (no. 24). Humilis, simplex. *Fol.* opp. brevi-petiol. *Pedunc.* 1–3-flori. *Labell.* saccat. *Calc.* breve.

5. *I. trilobata (no. 25). Elata, ramosa. *Fol.* opp. tern. et alt. *Pedunc.* solitar. 2–5-flori.

6. I. flavida (no. 26). Elata, ramosa. *Fol.* opp. et tern., longe petiol. *Fl.* flavi. *Pedunc.* solit., 2–4-flor. *Labell.* saccat. *Calc.* tumidum.

§ D 7. *I. Balsamina (no. 34).

§ E 8. *I. arguta (no. 52). *Fol.* longe acuminat. *Bract.* subulatæ, tortæ. *Calc.* breviusc.

9. *I. discolor (no. 53). *Fol.* ovato-acuminat. *Bract.* late ovatæ. *Calc.* breve, incurvum.

10. I. porrecta (no. 54). *Fol.* acuta. *Bract.* setaceæ. *Sep.* parva. *Calc.* attenuatum, incurvum.

11. I. bella (no. 55). *Fol.* acuta. *Bract.* setaceæ. *Sep.* parva. *Calc.* gracile, tortum, puberulum.

12. I. racemulosa (no. 56). *Fol.* acuminat. *Fl.* 6–8 intense violac. *Sep.* majuscul. *Calc.* breve, incurvum,

13. *I. latiflora (no. 57). *Fol.* acuminat. *Fl.* ampl. *Sep.* ampla. *Calc.* rectiusculum, elongatum.

14. *I. pulchra (no. 58). Humilis. *Fl.* ampli. *Sep.* magna. *Calc.* conicum, incurvum.
15. *I. Jurpia (no. 60). Fruticosa. *Fl.* ampli. *Sep.* parva. *Labell.* ventricosum. *Calc.* robusto incurvo.

§ F 16. I. bracteata (no. 65). *Bract.* pectinato-crinitæ.
17. *I. acuminata (no. 74). Humilis, simplex. *Calc.* elongatum.
18. *I. lævigata (no. 78). Fruticosa. *Labell.* ventricosum. *Calc.* breve.

§ G 19. *I racemosa (no. 80). *Ped.* verticillati.
20. *I. tingens (no. 88). *Ped.* alterni. *Calc.* breviusculum.
21. *I. leptoceras (no. 91). *Ped.* alterni. *Calc.* elongatum.

V. Mont. Himalaya.

§ C 1. *I. multiflora (no. 23). Elata. *Fol.* opp. alt. et tern. *Pedunc.* 1-flores.
2. *I. trilobata (no. 25). Elata. *Fol.* opp. alt. et tern. *Pedunc.* 2–5-flores.
3. I. Roylei (no. 27). Elata, caule tereti. *Bract.* ovato-lanceol. *Pedicell.* umbell. *Capsula* brevis, clavata.
4. I. Thomsoni (no. 28). Elata, caule tereti, lævi. *Bract.* subulatæ. *Calc.* conicum.
5. I. amplexicaulis (no. 30). Elata, caule 4-gono. *Fol.* supern. altern. amplexicaulia. *Capsula* linearis.
6. I. sulcata (no. 29). Elata, caule tereti sulcato. *Capsula* nutans, linearis.

§ D 7. *I. Balsamina (no. 34). *Fol.* longe lanceolata. *Calc.* rectum v. curvum.
8. I. spirifer (no. 48). *Fol.* ovato-lanceol. *Calc.* breviusculum spiraliter involutum.

§ E 9. I. serrata (no. 50). Gracilis, glabra. *Bract.* subulat. rectæ. *Sep.* parva. *Calc.* gracile, abrupte incurvum.
10. I. scabrida (no. 51). Robusta, pubescens. *Bract.* subulat. rectæ. *Sep.* ampla. *Labell.* conicum. *Calc.* incurvum.
11. *I. arguta (no. 52). Gracilis, glabra. *Bract.* subulat. tortæ. *Sep.* majuscula. *Labell.* infundib. *Calc.* incurvum.
12. *I. discolor (no. 53). Erecta, subramosa. *Bract.* late ovatæ. *Sep.* parva. *Calc.* apice involutum.
13. *I. latiflora (no. 57). Humilis, robusta. *Bract.* lanceolat. *Sep.* ampla. *Calc.* gracile, elongatum.
14. *I. pulchra (no. 58). Humilis, gracilis. *Flor.* ampli. *Bract.* lanceolat. *Sep.* ampla. *Calc.* conicum, incurvum.
15. *I. Jurpia (no. 60). Fruticosa. *Fl.* magni. *Sep.* parva. *Labell.* ventricosum.
16. I. puberula (no. 61). Pubescens. *Fl.* mediocr. violac. *Sep.* majusc. *Calc.* gracile, incurvum.

§ F 17. *I. lævigata (no. 78). Fruticosa. *Fl.* magni. *Bract.* et *Sep.* amplæ.

a. *Pedicelli verticillati.*

§ G 18. *I. racemosa (no. 80). *Fl.* parvi flavi.
19. I. bicornuta (no. 81). *Fl.* majusc. lilacini. *Labell.* inflatum.
20. I. longicornu (no. 82). *Fl.* majusc. *Labell.* conicum v. saccatum.

b. *Pedicelli alterni.*

21. I. insignis (no. 87). *Fol.* angusta. *Sep.* ampla. *Fl.* rosei. *Calc.* elongatum, gracile.
22. *I. tingens (no. 88). *Fl.* parvi, flavi. *Calc.* breviusculum.
23. I. longipes (no. 89). *Pedicelli* gracillimi, patentes. *Fl.* medioc. flavi. *Sep.* parva. *Labell.* conicum. *Calc.* hamatum.
24. I. urticifolia (no. 90). *Fl.* majusc. lilacini. *Bract.* caducæ. *Sep.* ovata. *Labell.* saccatum. *Calc.* breve, incurvum.
25. *I. leptoceras (no. 91). *Fl.* inter minores, flavi. *Sep.* ovata. *Labell.* infundibulif. *Calc.* gracile.
26. I. laxiflora (no. 92). *Fol.* longe petiol. ovat. *Fl.* majusc. *Sep.* parva. *Labell.* infundibulif. *Calc.* gracile.
27. I. glauca (no. 94). *Fol.* subtus glauca.
28. I. tuberculata (no. 95). *Fl.* mediocres v. parvi, lilacini. *Labell.* gibbum, ecalcaratum. *Capsula* clavata, tuberculata.
29. I. brachycentra (no. 96). *Fl.* parvi, flavi. *Labell.* conicum, ecalcaratum.
30. I. Lemanni (no. 93). *Fol.* longe petiolata, obtuse sinuato-dentata. *Fl.* rosei.

I. Impatiens, *L.*

A. Scapigeræ (see p. 112).

1. I. scapiflora (*Heyne in Roxb. Fl. Ind. Ed. Wall.* ii. 464; *Wall. Cat.* 4758!). Glaberrima, foliis reniformi v. orbiculari-cordatis, bracteis late ovatis obtusis, sepalis oblique late ovatis, calcare flore breviore incurvo clavato obtuso, vexillo brevi cucullato latiore quam longo, alis 3-lobis.—*Wight,* p. 967, non *Hook. Bot. Mag.* t. 3587.

I. scapiflora, *Wight & Arn. Prodr.* 137 in part.; *Paxt. Mag. Bot.* v. p. 101 *cum ic.*

Hab. Montibus Malabar! *Heyne, Wight, &c.* (fl. Jun.–Octob.).

Herba pedalis. *Folia* 2–3″ lata, integerrima v. remote denticulata, nervis radiantibus. *Flores* $\frac{1}{2}$–$\frac{3}{4}$″ lati. *Capsula* oblongo-lanceolata.

2. I. modesta (*Wight in Madr. Journ. of Science,* v. p. 13, et *Icones,* t. 968). Foliis ovato-cordatis acutis crenato-serratis supra pilosis subtus glaucis, bracteis ovatis apice subulatis, sepalis ovato-oblongis parvis, calcare flore breviore obtuso, alis 3-lobis. An var. *I. scapifloræ*?

Hab. Mont. Malabar! *Wight* (fl. Jul.–Aug.).

Ab *I. scapiflora* differt foliis supra pilosis ovatis acutis, floribus minoribus, bracteis apice subulatis, sepalis minoribus et calcare breviore.

3. I. ACAULIS (*Arn. in Hook. Comp. Bot. Mag.* i. 325). Glabra, foliis orbiculatis oblongisve basi rotundatis cordatisve, bracteis ovatis acutis, pedicellis elongatis, sepalis parvis ovatis obtusis, calcare gracillimo elongato, alis 2-lobis?—*Thwaites, En. Pl. Ceylon.* 68.

I. scapiflora, *Hook. Bot. Mag.* t. 3587; *Wight, Ic. Descript.* t. 967; et *Wight & Arn. Prodr.* quoad varietat. calcare interdum elongato.—I. bulbosa, *Moon. Cat.?*

β. Foliis profunde cordatis grosse crenatis.

Hab. Mont. Ceyloniæ! *Moon, Walker,* &c., et Malabariæ! *Nimmo, Lobb,* &c., var. β, Concan?, *Herb. Stocks.*

Variat insigniter statura; 2–12″ alta, et floribus ⅓″ ad 1¼″ latis.—*Vexillum* breve, galeatum, latius quam longum, retusum.

Thwaites (*En. Plant. Ceylon,* 68) suspects that this cannot be Heyne's plant, because that is described by Wallich as having the spur several inches in length; but in some of our specimens it is 2½–3 inches in length.

4. I. RIVALIS (*Wight in Madr. Journ. Science,* v. p. 13, t. viii. et *Icones,* t. 751). Foliis oblongis ellipticis ovato-oblongisve basi obliquis superne pilosis glabratisve, bracteis ovatis subacutis, sepalis late ovatis obtusis, calcare gracillimo elongato, alis 3-lobis.—An var. *I. acaulis?*

Hab. Mont. Malabariæ! et Concan! *Wight, Dalzell,&c.* (fl. July, August).

Statura variabilis 2–12″ alt. *Folia* serrata v. integerrima, basi attenuata, obtusa v. subcordata. *Flores* ½–1¼″ lati, vexillo fornicato brevi. *Semina* hispida.

In the dried state it is impossible to distinguish this from *I. acaulis,* of which I suspect it is a variety, as does Thwaites.

5. I. STOCKSII (*H. f. & T.*). Parvula, glaberrima, foliis late ovatis, membranaceis, bracteis ovatis acutis, sepalis late ovatis obtusis, labello basi saccato (calcare nullo), alis 3-lobis.

Hab. Mont. Peninsulæ (prov. Canara! et Maisor?), *Herb. Stocks. et Law.*

Herba parvula, 2–4″, tenerrima. *Petioli* graciles, foliis subæquilongi. *Folia* pollicaria, obscure crenato-dentata. *Flores* 6–8, sub ⅔″ lati. *Sepala* vexillo orbiculato, subæquilonga. *Labellum* ovatum, concavum.

B. OPPOSITIFOLIÆ (vide p. 112).

6. I. CHINENSIS (*Linn. Sp. Pl.*). Glabra, caule erecto, angulato, foliis setaceo-stipulatis subsessilibus linearibus acutis remote serratis subtus glaucis, pedicellis solitariis fasciculatisve, sepalis linearibus, calcare gracili elongato incurvo, vexillo orbiculari acuminato, alis semi-obovatis basi auriculatis.

I. fasciculata, *Lamk. Enc. Méth.* i. 359, var. *a*; *Wight, Ic.* 748 et *Madr. Journ. Sc.* v. p. 14; *W. & Arn. Prodr.* 138; *Hook. Bot. Mag.* 4631. —I. heterophylla, *Wall. in Roxb. Fl. Ind.* ii. 458, *Cat.* 4748!—Bal-

samina fasciculata, *D.C. Prodr.* i. 686.—I. setacea, *Coleb. in Hook. Ex. Flor.* ii. 137; *Miq. Plant. Hoh.* 1139.

Var. *β*. Foliis late oblongis obovatisve.

Hab. Mont. utriusque Peninsulæ a Concan! ad Travancore! alt. 5-8000 ped., *Wight, &c.*, Birma! *Wallich*! Malacca, *Griffith*! montibus Khasiæ alt. 3000-5000 ped.! *de Silva*, &c. (fl. May-August). (v. v.)

Dist. Hong-Kong! *Hance*.

Planta valde variabilis. *Caules* simplices v. ramosi, basi repentes ad nodos setas stipulæformes crassas 2 v. plures gerentes v. omnino nudi. *Folia* plerumque basi cordata, 2-4″, subcoriacea, superne glaberrima v. hispidula. *Pedicelli* patentes; flores læte rosei v. albi, interdum purpureo-variegati, 1-2″ lati, locis humidioribus umbrosisve depauperati. *Capsula* elliptico-oblonga, utrinque attenuata, vix ½″. *Semina* orbicularia, atra, lævia, opaca v. subnitida.

In *Bot. Mag.* this plant is erroneously supposed to be a native of Ceylon and the whole Himalayan range. Its broad-leaved form is certainly the *I. chinensis*, L., as I have ascertained from the Linnæan Herbarium.

7. I. OPPOSITIFOLIA (*Linn. Sp. Pl.*). Flaccida, ramis gracilibus, foliis glanduloso-stipulatis linearibus oblongo-linearibusve integris serratisve, pedicellis solitariis fasciculatisque, sepalis linearibus, vexillo late ovato v. orbiculato acuminato, labello conico calcare brevi recto v. incurvo.—*Wight & Arn. Prodr.* 139; *Wight*, no. 883.

I. ros-marinifolia, *Retz. Obs.* v. 29; *D.C. Prodr.* i. 686; *Wight, Ic.* 750, *in Madras Journ. Sc.* v. p. 14, t. ix.—I. Mysorensis, *Wall. Cat.* 4743 A!

Hab. Mont. tropicis Malabar! Ceylon! et penins. Malay.! frequens (fl. Aug.-Nov.).

Caulis 4-10″ simplex v. ramosus. *Folia* insigniter varia, membranacea, sessilia v. breve petiolata. *Flores* ¼-¾″ lati, albi v. pallide rosei. *Labellum* valde varians, calcare brevi. *Capsula* acuminato-rostrata, 2-6 sperma. *Semina* oblonga, paulo compressa, atro-brunnea, subnitida, funiculo substrophiolato.

Thwaites, *En. Pl. Ceylon* (*errata*) remarks that Mr. Ferguson, having examined Hermann's plant, considers the *I. rosmarinifolia* of Retz to be the true Linnean *I. oppositifolia*, and the fact is, that the two plants are one and the same. It is extremely common, and so variable, that no descriptions, plates, and specimens altogether agree: hence the confusion. *I. oppositifolia* of Wight and Arnott, as described from Wallich and Heyne's specimens, has the narrow capsule of *I. Kleinii*, with a short conical, nearly straight spur, but in Heyne's, Wallich's, and Wight's specimens, the ripe capsule is broadly elliptical, and the spur often incurved.

8. I. GRIFFITHII (*H.f. & T.*). Erecta, foliis superioribus ternis petiolatis anguste lanceolatis acuminatis marginibus remote serrulatis basi setosis subtus glaucis, pedicellis solitariis, sepalis ovato-oblongis acu-

minatis, calcare filiformi elongato, vexillo amplo obcordato dorso rostellato, alis late bilobis.

Hab. Peninsula Malayana; Monte Ophir! et Gerai! prope Malacca, alt. 3000 ped.! *Griffith, Lobb, Cumming.*

Species pulcherrima foliis ternis facile distinguenda, sparse puberula præcipue ad nodos petiolosque. *Folia* 2–3″ superne puberula. *Pedicelli* graciles. *Flores* 1″ diametr., rosei? *Calcar* pedicello longius.

9. I. Gardneriana (*Wight, Icones,* 1050). Glabra, caule basi repente radicante dein erecto, foliis oppositis et ternatim verticillatis ovato-lanceolatis acuminatis argute serratis basi ciliatis, pedicellis solitariis gracilibus, sepalis oblongis longe acuminatis, labello cymbiformi calcare gracili elongato, vexillo dorso alato acuminato, alis bipartitis segmentis retusis horizontaliter patentibus.

Hab. Mont. tropicis Malabariæ locis udosis apertis infra Sispara! *Wight* (fl. Jan., Feb.).

Herba spithamæa et altior. *Folia* 1–2″, supra sparse pilosula. *Pedicelli* suberecti, 2–3″. *Flores* sub ¾″ lati. *Capsula* oblonga. *Semina* glabra.

I. Griffithii simillima; sed differt foliis ovatis, vexillo late obcordato, floribusque majoribus.

10. I. rufescens (*Benth. in Wall. Cat.* 4747!). Foliis sessilibus oblongis ovato v. obovato-oblongis acutis serratis supra scaberulis subtus pallidis nervis rufo-tomentosis, pedicellis subsolitariis floribusque pubescentibus, sepalis lineari-lanceolatis setaceo-acuminatis, labello saccato calcare nullo, vexillo late oblongo acuminato, alis breviusculis bilobis lobo superiore auriculæformi.—*Wight & Arn. Prodr.* 138, *Icones,* t. 969. (An var. *I. tomentosæ*?)

Hab. Mont. tropicis Malabariæ! et Maisor! *Wight, &c.*

Caules 6–12″, superne sæpius tomentosi. *Folia* subcoriacea, *I. fasciculatæ* textura subsimilia. *Flores* ⅓–¾″ lati, rosei? *Capsula* ½″, rostrato-acuminata. *Semina* ut in *I. oppositifolia.*

11. I. tomentosa (*Heyne in Wall. Cat.* 4751! an *Wight*?). Foliis breve petiolatis oblongo-lanceolatis acutis serratis supra hispidulis, pedicellis solitariis binisve floribusque pubescentibus, sepalis lineari-lanceolatis acuminatis, labello sublonge saccato calcare brevi abrupte terminato, vexillo late oblongo acuminato, alis bilobis.

I. reticulata, *Wall. Cat.* 4750! *Wight & Arn. Prodr.* 139, ? *Wight,* p. 749 (var. *glabrata*).—I. ramosissima, *Dalzell in Hook. Kew Journ. Bot.* 1851, iii. 230.

Hab. Mont. Malabariæ! et Maisor! *Heyne, Wight, &c.*; Pegu! *Wallich* (ex *Exempl. manca*) (fl. Aug., Sept.).

Proxime affinis ut videtur *I. rufescenti* (ejus varietas?) a qua differt præcipue si non solum, labello breviter calcarato.

12. I. diversifolia (*Wall. Cat.* 4749!). Diffusa, foliis lineari- v. ovato-oblongis glaberrimis, basi subcordatis argute serratis, pedicellis soli-

tariis fasciculatisve, sepalis linearibus acuminatis, calcare filiformi elongato, vexillo parvo, alis late semiobovatis.—Descript. ex *Wight & Arn. Prodr.* 139.

I. heterophylla, *Wall. Cat.* 4748 *b.*—I. Arnottiana, *Miquel, Plant. Hoh.* 275.

Hab. Mont. temperatis Malabariæ! et Canaræ! *Klein, Wight, &c.* (fl. Oct.).

Species parvula, 4–6″, caulibus longe radicantibus. *Folia* ¾–1½″. *Flores* sub ¼″ lati. *Stigmata* (fid. *W. & A.*) distincta.

13. I. Lawii (*H. f. & T.*). Caulibus erectis ramosis foliisque subtus glaberrimis, foliis breviter oblongis basi obtusis sessilibus superioribus sensim minoribus cordato ½-amplexicaulibus remote serratis supra scaberulis, pedicellis breviusculis, floribus magnis, sepalis linearibus falcatis, vexillo orbiculari apice rostellato, labello parvo ecalcarato late concavo, alis maximis lobis lateralibus parvis.

Hab. Canara! et Malabar! *Law.*

Species pulcherrima, habitu ramoso *I. diversifoliæ,* qua differt floribus magnis, labello ecalcarato, foliis brevioribus superioribus sensim minoribus pedicellisque brevioribus.—*Caules* pedales. *Folia* ½–1″ longa, subacuta, subtus pallida. *Pedicelli* plerumque folio breviores linea puberula instructi, fructiferi deflexi. *Flores* ¾″ lati, pulchre violacei? *Capsulæ* immaturæ lanceolatæ vix ½″ long.

A very beautiful species or form allied to *I. inconspicua* and *diversifolia,* but very different in stature and the size of the flower; it is much branched, and the leaves are smaller upwards.

14. I. inconspicua (*Benth. in Wall. Cat.* 4741!). Parvula, ramosa, diffusa, glaberrima, foliis proteis anguste oblongis linearibus lanceolatisve serratis obtusis acutis acuminatisve, pedicellis puberulis, floribus minutis, sepalis lineari-subulatis, labello naviculari acuminato basi subsaccato ecalcarato, vexillo ovato acuminato, alis bilobis lobo superiore minore inferiore obovato.—*Wight & Arn. Prodr.* 139; *Wight,* p. 970.

I. pusilla, *Heyne in Wall. Cat.* 4745, fid. *W. & Arn.* non *Herb. Hook.*—An I. filiformis, *Wight & Arn. Prodr.* 140? an I. Mysorensis, *Roth. Wall. Cat.* 4743 in part.?

Hab. Mont. temperatis Malabariæ! *Heyne, Wight, Foulkes, &c.*; et Concan? *Stocks, &c.* (fl. Nov.).

Planta valde inconspicua et variabilis. *Folia* in exemplare cl. Wallichii (no. 4741 in *Hook. Herb.*) anguste linearia, basi cordata, 2-pollicaria; in cæteris et in Icone Wightii breviora oblonga lanceolata. *Flores* pallidi, ¼–½″ lati.—Exemplar *I. pusillæ,* Heyne, Wall. Cat. 4745 in Herb. Hook. diversa est species, calcare instructa.

15. I. Kleinii (*Wight & Arn. Prodr.* 140). Erecta, glabra, diffuse ramosa, foliis longe v. breve petiolatis membranaceis basi biglandulosis obovatis ovatis lanceolatisve acutis subserratis superne glabris v. pilosulis subtus glaucis, sepalis lineari-subulatis, labello ovato-acuminato

convexiusculo calcare elongato gracili, vexillo brevi glabro v. pilosulo orbiculato acuminato, alis longe unguiculatis late obovatis vix lobatis, capsula gracili.—*Wight. Ic.* 884; *Arn. in Hook. Comp. Bot. Mag.* ii. 325.

Balsamina minor, *D.C. Prodr.* i. 686.

Hab. Mont. Malabar! Canara! and Concan! *Heyne, &c.*

The very long slender spur best distinguishes this species from its small-flowered, opposite-leaved allies, except *I. diversifolia*, which has sessile leaves, and the following.

16. I. SETOSA (*H. f. & T.*). Herbacea, ramosa, ramis oppositis, foliis petiolatis setoso-stipulatis ovato-lanceolatis acuminatis obscure serratis margine basin versus distanter longe setosis utrinque pilosulis, pedicellis gracilibus, sepalis majusculis oblique ovatis, calcare elongato filiformi gracillimo incurvo.

Hab. Mont. Malabar! *Herb. Wight.*

Herba 2-pedalis. *Folia* 1½–2½″, submembranacea, subtus glauca, basin versus limbi et petioli pilis longis patulis flaccidis ciliata et stipulata. *Pedunculi* 1″ et ultra. *Flores* violaceo-purpurei, ⅔″ lati; calcare gracillimo, 1–1½″.

The long hairs towards the base of the leaves, at the margin, and at the position of the stipules, together with the rather large purple flower, and very long slender ascending spur, distinguish this from all others of the opposite-leaved 1-flowered section. I have seen but one specimen in Wight's Herbarium.

17. I. TENELLA (*Heyne in Wall. Cat.* 4746 A!). Parvula, erecta, subflaccida, foliis breve petiolatis lineari-oblongis lanceolatisve serratis subtus pallidis, floribus parvis glabris, sepalis linearibus acuminatis, labello naviculari v. conice saccato in calcar breve rectum v. incurvum attenuato, galea brevi, alis longe unguiculatis vix lobatis semi-obovatis falcatis.—An *I. Kleinii* var. parviflora?

I. pusilla, *Heyne, Wall. Cat.* 4745 in *Herb. Hook.*—I. tenuicula, *Steud.*

Hab. Mont. Malbariæ tropicis! *Heyne, Lobb, Jacquemont*, no. 1501.

Herba flaccida, ramosa, 3–6 pollicaris; ramis gracilibus. *Folia* varia, 1–2½ pollicaria, petiolata v. subsessilia. *Flores* parvi, sub ⅓″ lati, purpurei? *Capsula* tumidior quam in *I. Kleinii. Pedicelli* fructiferi horizontales (fid. *W. & Arn.*), erecti et deflexi in exempl. *Lobb.* lecto.

18. I. DALZELLII (*H. f. & T.*). Glaberrima, ramosa, foliis (2–3″) omnibus breve petiolatis ovato- v. oblongo-lanceolatis basi cordatis acuminatis spinuloso-serrulatis supra puberulis subtus pallidis, floribus mediocribus flavis, sepalis majusculis lineari-lanceolatis acuminatis, labello saccato calcare brevi curvo terminato, vexillo late cucullato dorso alato.

Hab. Mont. tropicis Concan! *Dalzell, Hb. Stocks* (fl. Aug.).

Caules crassi, 8–14 pollicares. *Folia* ½–1¾″ utrinque glabra v. superne puberula. *Pedicelli* solitarii v. pauci, glaberrimi. *Flores* glaberrimi, flavi (fid. *Dalzell*), sub ½″ lati. *Capsula* ½ unc. longa, medio turgida,

utrinque breviter attenuata. *Semina* 3–4, magna, oblonga, testa tenuiter crustacea, atra, nitida.—Habitus et folia fere *I. oppositifolii*; sed flores et capsulæ majores. *Capsulæ I. fasciculatæ* sed seminibus paucis, magnis, oblongis, subsplendentibus.

19. I. SALICIFOLIA (*H.f. & T.*). Erecta, robusta, pubescens v. tomentosa, foliis (3–4″) oppositis verticillatisque stipulatis breve petiolatis lanceolatis acuminatis setuloso-serratis, pedicellis fasciculatis brevibus, floribus pubescentibus glabratisve, sepalis parvis lanceolato-subulatis, labello magno longe saccato basi calcare brevi uncinato terminato, vexillo obovato dorso carinato et cornuto, capsula clavata glaberrima.

Hab. Mont. Khasia tropicis, alt. 3000–4000 ped.! *Lobb, &c.* (fl. Aug.–Oct.). (v.v.)

Caules 2–3 pedales, oppositi, ramosi. *Folia* $3\frac{1}{4}$″, submembranacea, serraturis simplicibus v. 1-setulosis, plerumque basin versus foliorum setulosis. *Stipulæ* e fasciculis setarum carnosis ad basin petiolorum, interdum 0. *Pedicelli* graciles, pollicares, interdum pedunculo communi brevissimo fasciculati. *Flores* speciosi, 1″ lati, purpurei. *Calcar* longitudine variabile.

C. SUBVERTICILLATÆ (vide p. 112).

a. Pedunculi uniflores (in *I. multiflora* interdum 2–3 flores).

20. I. LATIFOLIA (*Linn. Sp. Pl.*). Glaberrima, foliis suboppositis subverticillatisque 2–4″ longe petiolatis lanceolatis v. ovato-lanceolatis acuminatis margine crenato-serratis setulosisque, floribus amplis sepalis parvis ovato-cuspidatis, labello acuminato concavo calcare elongato gracili recto v. incurvo, vexillo obcuneato cornuto, alis bilobis, seminibus reticulatis.—*Wight, Ic.* t. 741.

I. cuspidata, *Wight et Arnott in Hook. Comp. Bot. Mag.* ii. 321.

Var. β *bipartita*, foliis omnibus alternis longioribus, *Thw. En.* 65.—I. bipartita, *Arn. in Comp. Bot. Mag.* i. 322.—I. floribunda, *Wight in Madr. Journ. Sc.* v. p. 7.

Hab. Mont. tropicis Malabariæ!; Nilgherries! et Ceylon! *Wight, Lobb, &c.*; Concan v. Canara! *Law, &c.*; var. β sylvis subtropicis Ceyloniæ alt. 5000–6000 ped.! *Walker, &c.* (fl. Oct.).

I. Leschenaultii et *I. lucidæ* valde affinis (an illarum forma luxurians?). A priore differt foliis sæpius subverticillatis, longius petiolatis, majoribus, flaccidioribus, vexillo majore.—*Folia* subtus secus nervos sparse pubescentia. *Flores* 1″ lati, calcare gracili plus minusve incurvo apice inflato, emarginato v. bifido. *Capsula I. Leschenaultii* et *latifoliæ* sed seminibus (fid. *Wt.*) reticulatis.

According to Wight, this differs from *I. Leschenaultii* in the form of the flower, long straight spur, and reticulated seed, but all my specimens have incurved spurs (as in *I. Leschenaultii*), the seeds in all seem to have a spongy testa which is rugose when dry, and the difference in the form of the detals is not so strong in my specimens as in Wight's figure. *I.*

Leschenaultii is probably a more robust, smaller leaved and flowered state of this plant. Thwaites (*Enum.* p. 65), who unites *bipartita,* Arn., with *cuspidata,* remarks that the anterior lobe of the petal varies a good deal. I have a specimen marked *I. cuspidata,* W.& A., by Gardner, and gathered by himself on the Nilgherries, in which the capsule is ¾" long, and the leaves, almost all alternate, have long soft spines at the base and on the petiole.

I have no doubt of this being Linnæus's *I. latifolia,* having examined the plant so named in the Linnean Herbarium; it consists of only the top of the stem, with the upper alternate leaves and one very large flower, with a curved spur that is forked at the tip for a long way up. There is no authority for the specimen in Linnæus's Herbarium, but *I. bifida* is written on the paper; so this is probably the original *I. bifida,* Thunb., described by Thunberg as having a bifid spur, and erroneously supposed to have been a native of the Cape of Good Hope, where it has never since been found.

21. I. LUCIDA (*Heyne in Wall. Cat.* 4738!). Glabra, ramosa, foliis (2–4") longe petiolatis membranaceis inferioribus alternis, vel aliis oppositis aliis alternis lanceolatis ovato-lanceolatisve acuminatis crenatis basi setosis, pedicellis subsolitariis, sepalis parvis ovatis acuminatis, labello concavo calcare elongato gracili, vexillo obovato, alis bilobis, lobis obovatis.—An. var. *I. latifolia,* L., floribus minoribus?

I. latifolia, *Wt. & Arn. Prodr.* 138; *Wall. Cat.* 4737! non *Linn.*

Hab. Mont. tropicis Malabariæ! *Heyne, Wight, Gardner.*

Herba 1–2', caule basi crassiusculo. *Petioli* ½–1", graciles. *Folia* subnitida, utrinque angustata, flaccida. *Flores* pro planta parvi, ¼–¾" lati, albi v. pallide rosei (*Wight*). *Capsula* ½ unc. longa, elliptica, turgida, utrinque attenuata, glabra v. pilosa. *Semina* sub 4, magna, oblonga, compressa, opaca, grosse reticulata.

Wight and Arnott remark that this differs from *I. Leschenaultii* in the densely pubescent capsules, but I find that to be a very inconstant character.

22. I. LESCHENAULTII (*D.C. Prodr.* i. 686; *Wall. Cat.* 4739). Suffruticosa, glaberrima, ramosissima, foliis 1–1½ pollicaribus plerisque oppositis petiolatis lanceolatis v. ovato-lanceolatis acuminatis serratis, pedicellis solitariis v. binis, sepalis parvis ovato-subulatis, labello saccato acuminato calcare elongato gracili curvo, vexillo late obovato rostellato, alis bilobis lobis obovatis.—*Wight & Arn. Prodr.* 136.

An var. I. latifoliæ, *L.*?; *Wight*, p. 970 bis.

Hab. Mont. Ceyloniæ, *Leschenault* (fid. *D.C.*) et Malabariæ! frequens, *Wight, &c.* (fl. tot. ann.).

Suffrutex 8-pedalis, ramosus, foliosus, caulibus ramisque suboppositis crassiusculis. *Folia* subcoriacea, petiolo ¼–½" longo. *Flores* fere 1" diametr., pallide rosei v. albi. *Capsulæ* et semina *I. latifoliæ* simillima sed minora.—Potius varietas *I. latifoliæ*, rigidior, densior, foliis minoribus, brevius petiolatis, magis serratis.

23. I. MULTIFLORA (*Wall. Cat.* 4742 !). Elata, ramosa, foliis 3–5″ oppositis ternis v. alternis stipulatis longe petiolatis membranaceis ovato-lanceolatis utrinque acuminatis crenato-serratis et basin versus setulosis utrinque sparse puberulis v. glaberrimis, pedicellis gracilibus breviusculis rarius in pedunculum brevem fasciculatis, floribus purpureis, sepalis parvis subulatis falcatis, labello saccato sacco basi obtuso calcare brevi v. elongato uncinato terminato, vexillo obovato galeato dorso cornuto, alis parvis.

Exemplar foliis omnibus oppositis pedicellis fasciculatis vix basi unitis.—*Wall. Cat.* 4742 !

Exemplar foliis oppositis et ternis=*tripetala*, Roxb., Wall. Cat., *I. ternifolia, Hb. Ham.* 4752 B !

Hab. Himalaya orientali tropica; Sikkim, alt. 2000–5000 ped. ! Mont. Khasia alt. 0–3000 ped. ! *Lobb, &c.* (fl. Aug.–Oct.). (v.v.)

Planta variabilis, affinis *I. trilobatæ,* sed flores solitarii vel si bini pedunculo communi brevissimo inserti. Ab sectione discrepat foliis interdum omnibus alternis, pedicellisque interdum in pedunculum brevem fasciculatis.

Caulis 2–4 pedalis, laxe ramosus, glaberrimus v. uti folia superne puberulus. *Stipulæ* e fasciculis setarum. *Folia* cum petiolo interdum spithamæa. *Pedicelli* pro planta breves, vix unciales. *Flores* $\frac{1}{3}$–1″ lati, longiores quam lati, læte purpurei v. violacei, calcare brevi v. elongato, $\frac{1}{3}$–$\frac{2}{3}$″. *Capsula* $\frac{1}{2}$–$\frac{2}{3}$″ pollicaris, angusto-elliptica, utrinque attenuata. *Semina* 6–8, oblonga, compressa, opaca, rugulosa.

b. *Pedunculi* 2-multiflores (vide *I. multiflora* in § C, *I. bracteata* et *I. janthina* in § F).

24. I. RADICANS (*Benth. in Wall. Cat.* 4763). Glaberrima v. pubescens, caule simpliciusculo stricto robusto folioso, foliis stipulatis (2–4″) breve petiolatis anguste lineari- v. oblongo-lanceolatis basi rotundatis acutis subserratis utrinque pubescentibus (raro glabris), pedunculis 1–3-floris, pedicellis gracilibus, floribus magnis, sepalis minimis, labello longe saccato basi calcare brevi uncinato terminato, vexillo galeato dorso gibboso subcornuto, alis parvis.

Hab. Mont. Khasia paludibus temperatis alt. 4000–6000 ped. ! *Mack, Griffith, &c.* (fl. Jul.–Sept.). (v.v.)

Species formosa, habitu foliisque fere *I. fasciculatæ,* tota pubescenti-pilosa v. rarius glaberrima.—*Caules* 6–10′, stricti, robusti, rarius ramosi. *Stipulæ* e fasciculis setarum. *Folia* subcoriacea, subtus pallida. *Pedunculi* pollicares, apice bracteolis lanceolatis tot quot pedicellis muniti. *Flores* speciosi, violaceo-purpurei. *Labellum* saccatum, sæpe $\frac{2}{3}$″ longum et $\frac{1}{2}$″ latum. *Capsula* $\frac{3}{4}$″, glaberrima, medio turgida, utrinque attenuata. *Semina* oblonga, compressa, testa pallida subrugosa membranacea.

25. I. TRILOBATA (*Coleb. in Hook. Exot. Flor.* ii. t. 141). Elata, ramosa, glabra, foliis (2–4″) oppositis alternis subverticillatisque stipu-

latis petiolatis supremis sessilibus ovatis v. ovato-lanceolatis acuminatis crenato-serratis sæpissime ciliolatisque membranaceis, pedunculis solitariis gracilibus elongatis 2–5-floris, pedicellis gracilibus, floribus amplis glaberrimis, sepalis minimis subsetaceis, labello longe saccato sacco conico abrupte v. sensim in calcar incurvum breve v. elongatum angustato, vexillo galeato late obcordato dorso cornuto, alis parvis bilobis.—*Wall. Cat.* 4762 A, et 4763 e Pundua, *Wall. Hb.*

Hab. Himalaya orientali tropica; Sikkim, alt. 2000–4000 ped.! *J. D. H.*; Mont. Khasia subtropicis frequentissime, alt. 3000–5000 ped.! (fl. Jul.–Oct.). (v.v.)

Planta variabilis, 3–4′, pulcherrima, ramosa, *I. multifloræ* affinis, sed differt pedunculis 2–5-floris, gracilibus, elongatis.—*Caules* v. rami graciles, elongati, pluries divisi. *Folia* vel omnia opposita, vel inferiora tantum opposita superiora alterna rarius terna v. verticillata, interdum cum petiolo spithamæa, textura, forma, stipulatione &c. omnino ut in *I. multiflora*. *Pedunculi* 1–3 pollicares, apice bracteolis setaceis tot quot pedicellis minuti. *Pedicelli* ½–1″, graciles. *Flores* speciosi, violacei. *Labellum* ½–⅔ pollicare. *Capsula* et semina ut in *I. multiflora*.

26. I. FLAVIDA (*H. f. & T.*). Caule gracili erecto, foliis (1½–2″) oppositis ternisque longe petiolatis ovato-lanceolatis utrinque angustatis glaberrimis multinerviis subserratis, pedunculis axillaribus solitariis petiolo longioribus erectis 2–4-floris, floribus flavis subumbellatis, bracteis recurvis, sepalis parvis ovatis oblongisve acuminatis, labello saccato subcampanulato v. ventricoso calcare hamato terminato, vexillo dorso gibbo.—An *Wall. Cat.* 4763 A (sub *trilobata*)?

I. fruticosa, *Lesch, Wall. Cat.* 4762 (*sphalm.*).—Impatiens e Pundua fl. flavo, *Wall. Herb. in Linn. Soc.* sine numero.

Hab. Sylvis tropicis Bengaliæ orientalis, Silhet! *Wallich*; Luckipore in Silchar! *J. D. H. & T. T.* (fl. Nov.). (v.v.)

Herba 2–3-pedalis, glaberrima. *Folia* inferiora opposita, superiora sæpius terna. *Pedunculi* sæpe oppositi, stricti, 1–2″; pedicellis ½–1″. *Flores* 1½″; sepalis viridibus, labello flavo; alis flavidis apices versus purpurascentibus. *Capsula* ¾″, sublanceolata, rostrata.

Some of Wallich's specimens of this in Herbs. Hooker, Lindley, and Henslow, have the ticket of *I. fruticosa* (e Nilgherry) attached to them; other specimens are, I think, catalogued under *I. trilobata* (4763 A).

27. I. ROYLEI (*Walpers, Repert.* i. 475). Elata, robusta, ramosa, glaberrima, foliis (2–4″) petiolatis stipulatis oppositis verticillatisque rarius alternis ovato- v. oblongo-lanceolatis lineari-oblongisve grosse serratis basi glanduloso-setigeris, pedunculis versus apices ramulorum elongatis erectis robustis multifloris, pedicellis subumbellatis breviusculis, sepalis majusculis late oblique ovatis acuminatis, labello longe saccato ventricoso lato basi obtuso rarius conico in calcar breve abrupte angustato, vexillo bilobo, alis amplis, capsula clavata.

I. **glandulifera**, *Royle, Ill.* 157. t. 28. f. 2, *Lindl. Bot. Reg.* 1840, t. 22; *Hook. Bot. Mag.* 4020.

Var. *α*. Foliis crenato-serratis glanduliferis.

Var. *β*, *moschata*. Foliis subverticillatis alternisque, grosse serratis mínus glandulosis.—*I. moschata*, Edgw. in Linn. Trans. xx. 38.

Var. *γ*, *candida*. Foliis supremis oppositis verticillatisque, floribus albis roseo maculatis.—*I. candida*, Lindl. in Bot. Reg. n. s. xiii. Misc. 85. n. 204.

Var. *δ*, *macrochila*. Foliis supremis alternis, pėtalorum lateralium lobis posticis elongatis.—*I. macrochila*, Lindl. Bot. Reg. 18, t. 8.

Hab. In Himalaya temperata occidentali frequentissima, a Nepal?, *Wallich*; ad Marri! alt. 6000–8000 ped., *Fleming* (fl. Jul.–Sept.). (v.v.)

Species insignis, gigantea, 4–10-pedalis, ramosa, caulibus basi crassitie pollicis, fistulosis?. *Folia* valde varia, longe v. brevius petiolata, basi rotundata v. angustata, grosse serrata; caule ad basin petioli glandulis crassis pedicellatis aucto. *Pedunculi* robusti, stricti, erecti, 2–5″, bracteis ovato-lanceolatis acuminatis. *Sepala* lateralia 2–4½″, viridia, subpersistentia. *Flores* læte rubro-purpurei, ⅔–1¼ unc. lati; calcare brevi incurvo. *Capsula* ½–⅔″, clavata. *Semina* edulia, magna, late obovoidea, testa opaca subrugosa.

This fine species approaches very closely indeed to some states of *I. longicornu*, Wall., *I. sulcata*, Wall. (*gigantea*, Edgw.), *I. Thomsoni*, and other allied species or varieties of Section H, but may always be known by the shortly clavate capsule. This short clavate capsule is indeed the only character by which many dried specimens can be distinguished from *I. longicornu* and others of that section.

The *I. moschata* of Edgeworth may be a different species, as Mr. Edgeworth suggests, but I cannot distinguish it by herbarium specimens. It is said to differ from *I. Roylei* in its musky odour, in its habit, and in the leaves being more deeply serrate; the latter appears to be a very variable character, the upper leaves being more deeply cut than the lower in both forms.

28. I. Thomsoni (*H. f.*). Herbacea, glaberrima, foliis infimis oppositis superioribus alternis verticillatisque ovato-acuminatis petiolatis glanduloso-stipulatis grosse duplicato-serratis, pedunculis aggregatis elongatis erectis pedicellatis subumbellatis racemosisve, bracteolis subulato-lanceolatis, floribus ⅓–¾″ long. sordide lilacinis maculatis, sepalis parvis ovato-lanceolatis, labello conice saccato in calcar breve rectum attenuato, capsulis inclinatis ¾″ long. lineari clavatis.

Hab. Himalaya temperata subalpina, Sikkim, alt. 12,000 ped.! *J. D. H.*; Kumaon et Garwhal, 12,000! *St. & W.* (6, 7, 8); Piti! et Kunawur, 9000–10,000 ped.! *T. T.* (fl. temp. pluv.). (v.v.)

Herba robusta, pedalis et ultra, *I. sulcatæ* var. *β* simillima, sed omnibus partibus minor, calcare breviore recto conico, sepalis angustioribus capsulisque brevioribus.

This puzzling plant occurs throughout the Himalaya, on the edge of the Tibetan climate, and in subalpine districts. It differs from *I.*

tuberculata in the longer spur and even capsules, from small states of *I. Roylei* in the small size, narrower capsules, subulate bracts and conical spur; from *I. longicornu* and its allies by the capsules being shorter, and forming an angle with the pedicel.

29. I. SULCATA (*Wall. Cat.* 4764). Caulibus erectis crassis sulcatis, foliis inflorescentia et floribus fere *I. Roylei*, sed capsula nutante elongata subæquali et angustiore.

I. gigantea, *Edgw.*! *in Linn. Trans.* xx. 38.

β, minor. Sepalo postico conico in calcar rectum sensim attenuato.

Hab. Himalaya temperata tota, alt. 7000–12,000 ped., Sikkim! *J. H.*; Nepal! *Wallich*; Kumaon! *Strachey & Wint.*; Simla! *T. T.*, *&c.*; Kunawur! *Grant*; Marri! *Fleming* (fl. temp. pluv.) (v.v.); *β*, Kunawur! *Grant, T. T.*

Herba gigantea; in Himalaya occidentali altit. 15 ped. et caule 5-poll. diamet. *fid. Edgeworth* attingit!—in Sikkim 5–7 pedalis.—*Caulis* fistulosus.

A very tall, coarse-growing species with furrowed stems, in the dried state so like *I. Roylei*, that it is impossible to distinguish them, except by the long capsule of this. My Sikkim specimens have often four lateral sepals. This appears to pass by numerous insensible gradations into *I. longicornu* and others. *I. Thomsoni* may be only a serrate state of it, connected by the var. *β minor* of *I. sulcata.* The inclined shorter capsules, which form an angle with the pedicel, best distinguish this from *longicornu*, &c. The seeds are large and eatable, as in *I. Roylei.*

30. I. AMPLEXICAULIS (*Edgew. Linn. Trans.* xx. 37). Glaberrima, ramosa, foliis (2–4″) inferioribus oppositis sessilibus oblongo-lanceolatis acuminatis crenato-serratis superioribus alternis amplexicaulibus ovato-lanceolatis, pedunculis axillaribus multifloris, sepalis ovatis acutis, labello late saccato calcare brevi, vexillo orbiculari bilobo, alis bilobis, capsula lineari.

Hab. Himalaya occidentali temperata, Kumaon, alt. 12,000 ped.! *Str. & Wint.*; Simla, 6000–8000 ped.! *Comta. Dalhousie*, &c.; Kulu! *Edgeworth* (fl. Sept.–Oct.) (v.v.)

Affinis *I. Roylei*, sed facile distinguenda foliis breve petiolatis basi latis superioribus basi profunde cordato-amplexicaulibus, pedunculis brevioribus, floribus paucioribus et minoribus non confertis et capsula angusta non clavata.—*Caulis* 3–4 pedalis, 4-angularis, *Edgw.*

31. I. VERTICILLATA (*Wight in Madr. Journ. Sc.* v. p. 15). Glaberrima, foliis oppositis verticillatisque (rarissime alternis) breve petiolatis lanceolatis utrinque acuminatis argute serratis serraturis infimis setigeris stipulis subulatis, pedunculis elongatis erectis subumbellatim 3–5-floris, pedicellis gracilibus, sepalis majusculis oblongo-lanceolatis, vexillo concavo breviter cornuto, labello cymbiformi calcare elongato gracillimo.

Hab. Mont. Malabar ad Shevagerry et Bolimputa! *Wight*; Cochin! *Johnstone* (fl. Aug.–Nov.).

Spithamæa ad 2-pedalem. *Caules* crassiusculi, simplices v. ramosi, ad nodos incrassati. *Stipulæ* porrectæ, spiniformes. *Folia* 2–4″ long. $\frac{1}{3}$–$\frac{1}{2}$″ lat., subcarnosula, subtus pallida. *Pedunculi* stricti, foliis breviores v. longiores, interdum validi et 3″ long. *Bracteæ* parvæ, subulatæ v. late ovatæ. *Pedicelli* $\frac{1}{2}$–1″, suberecti. *Flores* majusculi, $\frac{1}{3}$–$\frac{3}{4}$″ diam.; calcare $\frac{3}{4}$–1″ long. recto v. lente curvo. *Capsula* immatura breviuscula, glabra.

32. I. CIRCÆOIDES (*Wall. Cat.* 4772). Parvula, simplex, glabra, foliis paucis oppositis gracile petiolatis ovatis acutis subserratis basin versus ciliatis subtus glaucis, pedunculis solitariis gracilibus apices versus racemum brevem gerentibus, floribus parvis, sepalis orbiculatis acuminatis, vexillo parvo concavo, labello parvo concavo breviter conice calcarato, alis (pro flore) maximis.

Hab. Tavoy! *Wallich*; Pegu! *McLelland.*

Caulis simplex, spithamæus, gracilis. *Folia* 2″, petiolo gracili, membranacea. *Pedunculi* axillares, 1–1$\frac{1}{3}$″. *Bracteæ* parvæ, late ovatæ, concavæ. *Pedicelli* $\frac{1}{3}$″. *Flores* albi? *Sepala* viridia. *Alarum* lobus dependens $\frac{1}{3}$″ long., labello et vexillo multoties major. *Capsula* brevis?

Nearly allied to *I. Tavoyana*, Benth., but the spur is very short, and the leaves are mostly opposite.

33. I. GOUGHII (*Wight, Ill.* i. 160; *Icones*, t. 1603). Pusilla, caule debili gracili laxe ramoso, foliis plerumque oppositis pollicaribus petiolatis elliptico v. oblongo-ovatis obtusis grosse crenatis, pedunculis gracilibus foliis longioribus apice subumbellatim 4–6-floris, pedicellis capillaceis, bracteis caducis, floribus minimis, calcare flore æquilongo, capsulis ellipticis utrinque acuminatis.

Hab. Mont. Malabariæ prope Pycarrah! *Gough*; Maisor! *Lobb.*

Caulis 6–18″. *Folia* interdum omnia alterna, pallide viridia, basi cuneata, in petiolum non angustata. *Flores* rosei v. albi. *Vexillum* obcordatum acuminatum; labello cymbiformi, calcare brevi recto; alis bilobis, lobis retusis. *Capsula* $\frac{1}{6}$ unc. longa, oligosperma. *Semina* minima.

Wight remarks that this is a slender, diffuse-growing species, seeking support of adjacent plants, and then attaining 18 inches in length. The flowers are shortly racemose or subumbellate.

D. UNIFLORÆ (vide p. 113).

Vide *I. Leschenaultii, latifolia* (*β bipartita*) in § C.—In *I. spirifera* flores rarissime bini in eodem pedicello. Vide *I. puberula, arguta*, et aliæ in F.

34. I. BALSAMINA (*Linn. Sp. Pl.*). Glabrata v. pubescens, caule simpliciusculo, v. ramoso, foliis petiolatis anguste lanceolatis utrinqu-

acuminatis grosse serratis, petiolo glandulifero, sepalis minutis late ovatis, labello pubescenti cymbiformi calcare tenui elongato, vexillo alisque amplis roseis, capsula brevi dense tomentosa.

I. coccinea, *Sims, Bot. Mag.* 1256.—I. cornuta, *Linn. Sp. Pl.* 1328.—I. longifolia, *Wight in Wall. Cat.* 4734.—I. arcuata, *Wall. Cat.* 4735! Balsamina Hortensis, *D.C.*, &c.

α, vulgaris. Elata, foliis late lanceolatis, floribus magnis, calcare breviusculo.

β, longifolia, Wt. & Arn. Prodr. i. 136. Foliis anguste lanceolatis, floribus mediocribus, calcare elongato gracili.

γ, arcuata. Diffuse ramosa, foliis parvis anguste lanceolatis, floribus parvis, calcare elongato.

δ, macrantha. Humilis, 4-pollicaris, foliis ovato-lanceolatis, floribus magnis, calcare brevi.

ε, micrantha. Humilis, caule simplici, foliis parvis ovato-lanceolatis, floribus parvis, calcare gracili elongato.

ζ, rosea. Caule simpliciusculo elongato, foliis lineari-lanceolatis, floribus inter minores, calcare brevi incurvo.—I. rosea, *Lindl. Bot. Reg. Misc.* 1841, p. 6. no. 22, et vol. xxvii. t. 27.

Hab. Var *α* et *β* per totam Indiam tropicam locis humidis a Ceylon! et Malacca! ad Punjab! frequens; var. *γ*, *δ*, *ε* in Malabar! Kurg! &c. (fl. Aug.). (v.v.)

Dist. Ins. Malayanæ! et China!

Planta vulgatissima, valde protea. Omnes varietates variant foliis floribusque glabratis pubescenti-tomentosisve.

35. I. SCABRIUSCULA (*Heyne in Roxb. Flor. Ind.* ed. *Wall.* ii. 464). Humilis, erecta, ramosa, pubescenti-tomentosa, foliis ½–1″ paucis breve petiolatis lanceolatis acuminatis serratis, pedicellis brevibus, sepalis minimis, labello cymbiformi tomentoso, calcare 0.—*Wall. Cat.* 4729!; *Arn. in Hook. Comp. Bot. Mag.* ii. 322.

Hab. Mont. tropicis Malabariæ! *Heyne, Hb. Stocks.*

Dist. China (fid. Wt. & Arn.).

I. Balsaminæ proxima sed multo minor, foliis latioribus labelloque ecalcarato.

36. I. GLANDULIFERA (*Arn. in Hook. Comp. Bot. Mag.* ii. 322). Suffruticosa, glabra, ramis crassis apices versus foliosis, foliis maximis (6–10″) longe petiolatis amplis ovatis utrinque acuminatis setuloso-serrulatis, petiolo glanduligero, pedicellis numerosis axillaribus fasciculatis, sepalis minimis subulatis, labello piloso longe saccato sacco late conico calcare brevi incurvo apice incrassato, vexillo piloso late orbiculato bilobo dorso rostrato, alis exsertis bipartitis lobo laterali brevi rotundato terminali late semiobovato pendulo.

I. cornigera, *Hook. Bot. Mag.* 4623, non *Arn.*

Hab. Sylvis tropicis Ceyloniæ! *Walker,* &c.

Species insignis, *I. macrophyllæ* habitu foliisque simillima, sed plerumque glabra. *Flores* pallide roseo-purpurei, sacco stramineo.

37. I. MACROPHYLLA (*Gardner in Herb. Hook.* and *Bot. Mag.* 4662). Suffruticosa, glabra, ramis crassis apices versus foliosis, foliis *I. glanduliferæ* sed sæpissime pubescenti-pilosis, pedicellis brevibus fasciculatis, floribus glaberrimis, sepalis minimis, labello acuminato breviter saccato calcare brevi minimo, vexillo oblongo dorso alato apice acuminato rostrato, alis minimis bipartitis inclusis.

I. glandulifera, var.?, *Arn. in Comp. Bot. Mag.* ii. 323.

Hab. Sylvis montosis subtropicis Ceyloniæ, alt. 5000–7000 ped.! *Walker*, &c.

Frutex 10–12 pedalis (fid. Walker), foliis interdum 16″. *I. glanduliferæ* affinis, sed differt floribus multo minoribus, glaberrimis, labello aurantiaco, vexillo angusto apice rostrato coccineo, alis minimis inclusis.

38. I. REPENS (*Moon Cat.*). Glaberrima, caulibus prostratis basi repentibus vage diffuse ramosis, foliis longe petiolatis ovato cordatis v. reniformi-rotundatis acutis, pedicellis foliis multo longioribus ebracteolatis, sepalis parvis oblongo-lanceolatis, labello late saccato subconico calcare brevi incurvo, vexillo latiore quam longo suborbiculato dorso corniculato, alis alte bilobis lobis brevibus latis.—*Wight, Ill.* 160. t. 61; *Hook. Bot. Mag.* 74. t. 4404.

Hab. Sylvis montosis tropicis Ceyloniæ, alt. 4000 ped.! *Walker*, &c.

Caules crassi, carnosi, hic illic radicantes. *Folia* ½–1″ lata, petiolo breviora, interdum obscure subserrata. *Pedicelli* solitarii, pollicares. *Flores* aurei, speciosi, 1″ longi; labello et vexillo pubescente. *Ovarium* hirsutum.

39. I. LEPTOPODA (*Arn. in Hook. Comp. Bot. Mag.* ii. 321). Erecta, ramosa, glaberrima, caulibus gracilibus, foliis longe petiolatis (1–3″) lanceolatis ovato-lanceolatisve acuminatis crebre crenato-serratis petioloque interdum glanduloso setosis, pedicellis ebracteolatis axillaribus subsolitariis gracilibus strictis, floribus parvis, sepalis parvis oblongo-lanceolatis, labello cymbiformi calcare gracili elongato (v. abbreviato), vexillo obcordato dorso cornuto, alis horizontaliter patentibus (? *I. latifolia*, Wall. Cat. 4737, in Herb. Henslow.). An var. *I. latifoliæ*, L.?

Var. β, *brevicornu*. Calcare abbreviato flore breviore.—I. brevicornu, *Arn. l. c.*

Var. γ, *gibbosa*. Sepalo postico cymbiformi subsaccato calcare nullo.—*Arn. l. c.*

Hab. Sylvis montosis subtropicis Ceyloniæ! alt. 5000–8000 ped., *Walker* &c. (fl. Sept.–Nov.).

Herba 1–3-pedalis. *Caules* basi interdum suffruticulosi. *Folia* submembranacea, basi attenuata, in var. *brevicornu* interdum 4-pollicaria. *Flores* ⅓–½″ lati, latiores quam longi, ob petala lateralia horizontaliter patentia. *Capsula* ⅓″, glabra v. puberula.

Thwaites describes this as being very common and variable, and points out its close affinity with *I. Leschenaultii*, in all my specimens of which the leaves are more or less opposite.

40. I. TRUNCATA (*Thw. En.* p. 66). Debilis, subramosa, caulibus superne foliis floribusque sparse puberulis glabratisve, foliis (1–1½″) petiolatis ovatis ovato-lanceolatisve acuminatis setuloso-serratis membranaceis, petiolo sparse glanduloso, pedicellis 1–3 bracteolatis gracilibus, floribus parvis, sepalis minutis subulatis, labello saccato sacco conico, calcare breve cylindrico truncato, alis inæqualiter bilobis.

Hab. In sylvis subtropicis Ceyloniæ alt. 4000–6000 ped! *G. Thomson, Thwaites* (fl. Oct.).

Affinis *I. leptopodæ*, sed humilior et ut videtur habitu diversa, foliis junioribus petiolis pedunculisque hispidulis, floribusque pubescenti-pilosis.

Thwaites compares this with Wight's figure of *I. inconspicua*, Bth., which, however, differs much in the opposite leaves, form of the spurless flowers, and longer, more slender pedicels.

41. I. PENDULA (*Heyne in Wall. Cat.* 4744!). Erecta, ramosa, ramis linea pubescenti cum petiolis continua, foliis (¼–½″) breve petiolatis ellipticis subcordatis v. ovato-ellipticis acutis remote serratis puberulis, pedicellis ebracteolatis solitariis pilosis fructiferis deflexis, floribus minutis glabris, sepalis labello concavo non calcarato, vexillo cornuto, capsula parva ventricosa.—*Wight & Arn. Prodr.* 137 (descr. secus *Wt. & Arn. Prodr.*).

Hab. Malabar vel Maisor, *Heyne.*

Affinis *I. scabriusculæ* fid. cl. Wt. & Arn. sed differt floribus minutis glabris.

42. I. MYSORENSIS (*Roth. Nov. Sp.* 164). Caule simplici gracili erecto, foliis alternis lanceolatis, utrinque acuminatis glabris, pedicellis binis axillaribus filiformibus folio ½ brevioribus, floribus parvis, calcare recto brevi, capsula dense pubescente.—*Roth. Nov. Sp.* 164; *Wall. Cat.* 4743; *Wight, Cat.* 979 (descript. ex *Wight & Arn.* p. 137).

Hab. Maisor, *Heyne, Wight.*

Of this species I know nothing, except from the specimens in the Linnean Society, and the description of Wight and Arnott rendered above. It would appear to be very near *I. pendula*, but differs in the spurred flowers and pubescent capsules.

43. I. MUNRONII (*Wight, l. c.* 1049). Erecta ramosa tota pubescenti-pilosa, caule lignoso, foliis (1–2″) versus apices ramorum longe petiolatis ovatis ovato-lanceolatisve utrinque acuminatis subserratis, pedicellis ebracteolatis solitariis, sepalis hirsutis magnis late ovatis lanceolatisve acuminatis, labello in calcar conicum hamatum sensim attenuato, vexillo orbiculari dorso alato, alis brevibus obovatis bifidis.

Hab. Mont. tropicis Malabariæ, sylvis ad Sisparah! *Wight, Gardner,* &c. (fl. Jan.).

Suffruticulus pedalis, ramis patentibus, siccis cicatricibus ad basin foliorum delapsorum nodulosis. *Folia* utrinque pubescenti-pilosa. *Pedicelli* unciales. *Flores* pollicares, purpurei. *Ovarium* pilosum.

44. I. DASYSPERMA (*Wight in Madr. Journ. Sc.* v. p. 7. f. 2, *Ic.* 742). Herbacea caule simpliciusculo, foliis (2–4″) longe petiolatis ovato-lanceolatis utrinque acuminatis crenato-serratis supra pilosis subtus glaberrimis, pedicellis ebracteolatis subsolitariis, floribus inter minores, sepalis minutis ovatis acuminatis, labello cymbiformi calcare gracili incurvo, vexillo obcordato, alis profunde bifidis horizontaliter patentibus, capsula glaberrima, seminibus pilosis.

Hab. Mont. tropicis Malabariæ sylvis prope Courtallam, *Wight* (fl. Aug., Sept.).

Glaberrima 1–2 pedalis, flaccida; ramis suboppositis. *Folia* petiolata, petiolo et basi folii interdum glandulis paucis stipitatis ornato, 2–3″ longa. *Pedicelli* pollicares, graciles. *Flores* sub ½″ lati. *Calcar* gracile interdum pilosum. *Capsula* oblique turgida, rostrata.

45. I. FLACCIDA (*Arn. in Hook. Comp. Bot. Mag.* 322). Herbacea, glaberrima, laxe ramosa, foliis (2–4″) petiolatis ovatis ovato v. elliptico-lanceolatis crenulatis basin versus setoso-glandulosis utrinque acuminatis, pedicellis ebracteolatis solitariis binisve elongatis erectis, flore majusculo, sepalis minutis linearibus, labelli limbo parvo calcare gracillimo elongato, vexillo obcordato, alis bipartitis horizontaliter patentibus.

I. latifoliæ, *L.*, var.? an I. latifolia, *Wall. Cat.* 4737 A? et I. lucida, 4738 in *Herb. Henslow.*

β. Foliis capsulaque pilosulis.

Hab. Mont. tropicis Ceyloniæ alt. 4000–6000 ped.! *Walker*, &c.; Malabariæ! *Gardner*, &c. (fl. Oct.–Dec.). (v.v.)

Var. β. Peninsula Malayana ad Moulmein! *Lobb.*

Herbacea 1–2 pedalis, tota glaberrima, nisi var. β. *Folia* plerumque ampla, membranacea, petiolo setoso v. glanduloso v. nudo, *Pedicelli* graciles, 1–2″. *Flores* magnitudine varii, ¾–1½″ lati, purpurei, violacei v. rosei, speciosi; alis profunde bilobis, lobis obovato-cordatis in var. β apice bilobis. *Capsula* 2½ pollicaris, turgida, utrinque attenuate rostrata, polysperma. *Semina* pilosula.

46. I. PULCHERRIMA (*Dalzell in Hook. Journ. Bot.* 1850, vol. ii. 37). Glabra, caule herbaceo simpliciusculo, foliis (3–5″) longiuscule petiolatis membranaceis ovato-lanceolatis utrinque acuminatis supra pilosulis basin versus et petiolo setoso-glandulosis, pedicellis ebracteolatis 2–3-nis erectis, floribus maximis, sepalis minutis subulatis, labelli limbo parvo subcymbiforme in calcar elongatum gracile attenuato, vexillo orbiculari bifido dorso rostrato, alis amplis bipartitis lobis obovatis apice bilobis.—*Hook. Bot. Mag.* 4615.

Hab. Mont. Concan tropicis! *Dalzell* (fl. Aug.).

Species nobilis, *I. flaccidæ* affinis, sed omnibus partibus duplo major. *Flores* 2–2½″ longi, pallide purpurei. *Pedicelli fructiferi* erecti. *Capsula* glaberrima, cernua; semina pauca, opaca, subrugosa v. tuberculata, glabra.

47. I. HENSLOVIANA (*Arn. in Hook. Comp. Bot. Mag.* ii. 322). Caule suffruticoso crasso noduloso, foliis hirsutis pubescentibus glabratisve lanceolatis ovato-lanceolatisque utrinque acuminatis serratis basi v. petiolo glanduloso, pedicellis ebracteolatis subsolitariis elongatis erectis, floribus magnis, sepalis amplis late ovatis acuminate mucronatis, labelli limbo parvo calcare elongato gracili incurvo, vexillo obcuneato v. orbiculari bilobo, alis horizontaliter patentibus bipartitis segmentis obovatis bilobis.

I. albida, *Wight, Ic.* 743, *et in Madr. Journ. Science*, v. p. 7. f. 1.

Hab. Mont. tropicis Ceyloniæ! alt. 4000–6000 ped., *Walker, &c.*, et Malabariæ, alt. 2000–3000 ped.! *Wight* (fl. Sept.–Oct.).

Species pulcherrima, sæpissime tota pubescenti-pilosa, sed interdum glabrata v. imo glaberrima, ob caules crassos, pedicellos elongatos, flores magnos et sepala lateralia ampla facile dignoscenda. *Capsula* glaberrima v. pilosa.

48. I. SPIRIFER (*H. f. & T.*). Glaberrima v. pilosula, foliis longe petiolatis ovato-lanceolatis caudato-acuminatis grosse crenatis in petiolum angustatis supremis subverticillatis sessilibus basi glandulis stipulatis, pedicellis subterminalibus erectis solitariis v. rarius binis basi carinatis, floribus 1½ poll. purpureis fauce flavis sepalis amplis oblique ovato-cordatis cuspidatis, labello saccato subcampanulato in calcar breviusculum spiraliter tortum sensim angustato, capsula lineari-lanceolata.

Hab. Sylvis temperatis subtropicisque Himalayæ orientalis Sikkim, alt. 4000–7000 ped.! *J. D. H.* (fl. Oct.–Dec.). (v.v.)

Species insignis, 2–4-pedalis, inter hanc sectionem et § E media, ob pedicellos cum binis basi connatos. *Folia* 1–3″, interdum puberula. *Pedicelli* pollicares. *Labellum* pallide roseum, rubro-lineatum. *Vexillum* orbiculatum, apiculatum, dorso cornutum; alarum segmentis late purpureis, posticis lineari-oblongis pendulis. *Capsula* pollicaris. *Semina* parva, orbicularia, puberula.

A very beautiful species, readily distinguished by the large flowers, short, spirally-incurved spur, long, deeply-conical, posticous sepal, and long capsules. It is very closely allied to *I. arguta*, H. f. & T., but differs in the almost invariably solitary flowers, and in the absence of the curious twisted bracteoles.

49. I. CAPILLIPES (*H. f. & T.*). Parvula, diffuse ramosa, glaberrima, caule gracillimo, foliis 1–2″ petiolatis lineari-lanceolatis lanceolatisve grosse crenatis nitidis flaccidis eglandulosis, pedicellis solitariis v. binis capillaribus 1-floris, floribus minutis, sepalis falcatis, labello saccato sacco ventricoso cylindraceo calcare minimo incurvo, vexillo lineari oblongo elongato, alarum lobis acuminatis.

Hab. Peninsula Malayana ad Moulmein! *Lobb.*

Species valde singularis ob folia hyalina angusta, flaccida grosse crenata, pedicellos capillares, flores minutos vexillumque elongatum. *Caules*

4–6″. *Petioli* gracillimi ½–1 pollicares. *Pedicelli* petiolos subæquantes. *Flores* albi? ⅓″ lati. *Capsula* late elliptica, basi angustata, apice acuminata, similis *I. racemuliferæ.*

E. Laterifloræ (vide p. 113).

§ *a.* Capsula anguste linearis elongata (vide *I. spirifer* in § D).

50. I. serrata (*Benth. in Wall. Cat.* 4771!). Glabra, caule erecto simpliciusculo v. basi ramoso, foliis (1–3 poll.) subsessilibus v. petiolo alato ovato-lanceolatis acuminatis argute serratis eglandulosis petiolo basi glandula globosa stipulata v. nuda, pedicellis gracillimis versus medium bifidis 2-floris, bracteis setaceis dissitis, floribus ⅜–1½″ albidis flavisve rubro-maculatis, sepalis parvis falcatis, calcare abrupte incurvo flore longiore, capsula anguste lineari.

Hab. Umbrosis Himalayæ temperatæ centralis et orientalis, Nepal! *Wallich*; Sikkim 8000–10,000 ped.! *J. D. H.* (fl. Jul.–Sept.). (v.v.)

Caules graciles, 1–3 pedales. *Folia* membranacea, glabra. *Flores* plani, labello oblique conice saccato, in calcar attenuato; vexillo oblongo subunguiculato, alis unguiculatis lobo postico falcato. *Capsula* 1–1¼″ angustissima. *Semina* numerosa, 1-seriata, lineari-obovata, grosse tuberculata.

A smaller, more delicate and graceful species than is *I. scabrida*, D.C., with very differently shaped spur and petals.

51. I. scabrida (*D.C. Prodr.* i. 687, *Wall. Cat.* 4769 *b*; *Edgew. in Wight, l.c.* t. 323). Caule simpliciusculo robusto foliisque pubescenti-pilosis glabratisve, foliis ovatis lanceolatis ovato-lanceolatisve acuminatis in petiolum angustatis grosse serratis eglandulosis petiolo basi glandulis 2 grossis stipulato, pedunculis foliis multo brevioribus 2–6-floris, bracteis setaceis dissitis, floribus aureis, sepalis amplis ovato-cordatis acuminatis, labello late conico calcare incurvo, vexillo dorso cornuto, capsulis lineari-elongatis.—*Wall. Cat.* 4769!

I. tricornis, *Lindl. Bot. Reg.* xxvi. 1840, t. 9; *Hook. Bot. Mag.* 4051.—I. punctata, *Wall. MSS.*—I. cristata, *Wall. in Roxb. Fl. Ind.* ii. 456.—I. calycina, *Wall. l. c.* p. 463.—I. Hamiltoniana, *Don, Prodr.* 204.

Hab. Umbrosis Himalayæ temperatæ, Bhotan! *Griffith*; Nepal! *Wallich*; Kumaon! *Str. & Wint.*; Simla! *Comta Dalhousie*, &c.; Kunawur! *Grant*; Sikkim, fid. *Icon. Cathcart* (fl. temp. pluv.). (v.v.)

Species 3–5 pedalis, plerumque robusta, plus minusve pubescens, sed interdum glabra v. glaberrima. *Folia* petiolata, v. subsessilia. *Pedunculi* interdum paniculati. *Flores* 1″ longi, speciosi, aurei, punctis rubris consperse. *Capsula* 1–1¾″ longa, glabra v. puberula. *Semina* 1-seriata, oblonga, vix tuberculata.

The *I. calycina*, Wall., seems from specimens in Lindley's Herbarium to be the same as his *cristata*, and which is undoubtedly the *I. scabrida* of De Candolle. I have no Sikkim specimens, but a drawing from

Cathcart's collection of what appears to be a very pale-flowered variety of it, and which has four lateral sepals.

52. I. ARGUTA (*H. f. & T.*). Glaberrima, caule gracili ramoso, foliis 2–2½″ breve petiolatis v. petiolo alato elliptico-lanceolatis utrinque longe acuminatis argute serratis dentatisve basi setosis superioribus sæpe petiolo glanduligero sed basi glandulis non stipulato, pedunculo brevissimo 1–2-floro, bracteis setaceis elongatis tortis, pedicellis elongatis, floribus magnis cæruleis lilacinisve, sepalis oblique ovatis cuspidato-acuminatis majusculis, labello longe saccato late infundibuliformi v. campanulato calcare breviusculo hamato, vexillo dorso subrostrato.

Hab. Umbrosis Himalayæ orientalis temperatæ et tropicæ; Sikkim, alt. 5000–7000 ped.! *J. D. H.*; Mont. Khasiæ, alt. 3000–6000 ped.! *Lobb*, &c. (fl. Jun.–Oct.). (v.v.)

Species insignis 1–4 pedalis, *I. spirifer* affinis et similis, sed caules robustiores, folia majora, argute dentata v. serrata, basi ciliata (rarius nuda), petiolus sæpissime glandulosus, pedunculis brevissimis, bifloris, bracteæ elongatæ tortæ, et calcar hamatum non circinatum.—*Capsula* linearis, pollicaris. *Semina* pauca, orbicularia, opaca, granulata. *Folia* inferiora sæpius non glandulosa.

The long, subulate, twisted bracteoles of this species are quite peculiar to it; in other respects it resembles *I. spirifer*, &c. It is very common in the Khasia mountains, and is probably distributed amongst Wallich's plants, though I have failed to recognize it amongst the Linnean Society's collections, Henslow's, Bentham's, or those of Kew. In some of my Sikkim specimens there are four lateral sepals, as there are also in that figured by Cathcart's artists; in others only two.

b. *Capsula* brevis v. ignota.

53. I. DISCOLOR (*De Prodr.* i. 687; *Wall. Cat.* 4767). Caule erecto subramoso, foliis petiolatis 1–2″ ovatis acuminatis eglandulosis grosse crenato-serratis supra pilosulis, pedicellis breviusculis 2-floris, bracteis parvis late ovatis dissitis, floribus magnis, sepalis parvis ovatis acuminatis labello longe saccato ventricoso calcare brevi incurvo v. circinato, vexillo dorso cornuto.

I. insignis, *Wall. Cat.* 4766, in part.

β. Glaberrima, foliis glaberrimis.

Hab. Himalaya centrali temperata, Nepal! *Wallich*; montibus Sikkim! et Khasia! umbrosis humidis (fl. Jul.–Sept.). (v.v.)

Caulis 3–5 pedalis. *Folia* membranacea, majora et latiora quam in *I. elegans* et *arguta*. *Pedunculi* gracillimi, foliis breviores, arcuati, iis *I. longipes* et *urticifolia* similes, sed breviores, pedicellis capillaceis. *Flores* 1¼″ longi. *Capsulæ* lineari-clavatæ, immaturæ?

I. urticæfoliæ simillima et forsan ejus varietas, sed bracteæ breviores et folia apice non caudato-acuminata; calcare involuto non abrupte inflexo.

A very common and variable species, probably not distinct from *I. urticæfolia*, but the inflorescence is more lateral on the plant, and the leaves more uniform, and less crowded upwards.

54. I. PORRECTA (*Wall. Cat.* 7275 !). Humilis, pedalis, glaberrima, caule simplici basi repente radicante dein erecta, foliis pollicaribus longe petiolatis ovato-ellipticis acutis serrulatis basin versus biglandulosis, pedunculis paucis folio brevioribus 2–3-floris, bracteis setaceis, floribus cum calcare 1½ pollicaribus flavis, sepalis parvis ovatis acuminatis, labello subconice saccato calcare sensim attenuato apice hamato terminato.

Hab. Paludibus temperatis montibus Khasiæ! *Wallich*, prope Kalapane, alt. 5000–6000 ped., *J. H. & T. T.* (fl. Aug.). (v.v.)

Species pulchra, *I. discolor* proxime affinis. *Caules* vix pedales, crassiusculi, ad basin petiolorum non glandulosi. *Folia* pauca, 6–8″, petiolo ¾–1″. *Pedunculi* et pedicelli graciles. *Flores* pro planta magni, pallide aurei v. straminei, lineis rubris pulchre striati, vexillo dorso rostrato. *Capsula* ?

In habit and structure of the flower this is very closely allied to *I. bella*, but has always several flowers on one peduncle, &c. (see notes under *I. bella*).

55. I. BELLA (*H. f. & T.*). Sparse puberula, uniflora rarius biflora, caulibus simpliciusculis 3–5″ basi repentibus dein erectis, foliis 1–1½″ paucis membranaceis longe petiolatis late ovatis subacutis crenulatis, pedicello erecto gracili pubescente medio bracteolato 1–2 flore, sepalis majusculis oblongo-lanceolatis acuminatis, labello conice saccato in calcare gracili torto puberulo producto, vexillo late obovato dorso cornuto alis bilobis lobo basali auriculæformi terminali obovato elongato.

Hab. Paludibus temperatis mont. Khasiæ! *Griffith, Lobb*; prope Kalapane alt. 5000 ped., *J. H. & T. T.* (fl. Aug.). (v.v.)

Planta pulcherrima, membranacea, sicca flaccida. *Caules* basi simplices v. ramosi. *Petioli* ½–1″, pubescentes, nudi v. parce setosi. *Folia* subtus nitida, basi interdum glanduligera v. setosa. *Flores* tenerrimi, ⅔″ longi, aurantiaci v. aurei, petalis labelloque intus purpureo-striolatis. *Ovarium* glaberrimum, ⅓″. *Capsula* elliptico-lanceolata, pubescens. *Semina* subrotunda, papilloso-pubescentia.

Closely allied to *I. porrecta*, Wall., which has always several flowers on each peduncle, but the bracts are narrower, the whole plant more membranous and pubescent, the lateral sepals are larger, and the long lobe of the alæ much longer.

56. I. RACEMULOSA (*Wall. Cat.* 7274 !). Glaberrima, caule crassiusculo simplici v. basi ramoso foliis 1–2″ petiolatis ovatis lanceolatisve acuminatis obtuse serratis eglandulosis, racemis folio brevioribus 6–8-floris, pedunculo flexuoso, bracteis oblongis, pedicellis gracilibus,

floribus $\frac{3}{4}''$ intense violaceis, sepalis majusculis oblique ovatis acutis, labello cymbiformi calcare breviusculo incurvo flore æquilongo, vexillo parvo orbiculari, alarum lobo postico maximo late semiorbiculari obtuso.

Hab. Locis udosis apertis temperatis et subtropicis montibus Khasiæ; alt. 4000–5000 ped.! *Gomez, Lobb, J. H. & T. T.* (fl. Jun.–Oct.). (v.v.)

Species pulcherrima, nullæ arcte affinis. *Caulis* 6–8″. *Folia* membranacea, petiolo basi glandulis non stipulato. *Racemi* pollicares, omnes laterales, horizontaliter patentes. *Calcar* $\frac{1}{2}$–$\frac{3}{4}''$, arcuatum ascendens, apice obtuso. *Capsula* $\frac{1}{3}''$, brevis, obovato-lanceolata, basi breviter attenuata, apice acuta, oligosperma; dehiscens ab apice. *Semina* parva.

This has the fruit of many species in § B, and the racemose flower of the *Racemosæ*.

57. I. LATIFLORA (*H. f. & T.*). Caule humili robusto puberulo, foliis petiolatis lanceolatis elliptico-lanceolatisve acuminatis crenato-serratis basi sæpissime glanduloso-setigeris subtus glaucis, pedunculis erectis crassis bis terve divisis simplicibusve, bracteis dissitis lanceolatis, floribus magnis roseis, sepalis amplis late ovatis acuminatis, labello cymbiformi in calcar rectum v. paulo curvum gracile elongatum abrupte contracto, vexillo dorso alato.

Hab. Umbrosis subtropicis montibus Khasia ad Nunklow, alt. 3000–4000 ped. *Lobb, J. H. & T. T.* et ? Himalaya orientali tropica Sikkim, alt. 2000–4000 ped., *J. H.* (fl. Oct.).

Statura habitu plerisque notis *I. pulchræ* proxima, sed differt floribus conspicuis, calcare gracili elongato, non cum sepalo conico sensim continuo. *Flos* $1\frac{1}{2}$–$2''$ latus, pallide roseus v. violaceus; calcare 1 ; petalis patentibus amplis; vexillo orbiculari bilobo, alis bipartitis lobis patentibus antico obovato retuso postico semiovato acuto. *Capsula* et semina immatura sed *I. pulchræ* ut videtur similia.

The Sikkim specimens look different; they have broader leaves and single smaller flowers on ebracteolate peduncles, but from drawings of both, taken on the spot, I am unable to point out any further differences between them.

58. I. PULCHRA (*H. f. & T.*). Humilis, glaberrima, caule simplici, foliis 2–3″ crassiusculis petiolatis elliptico- v. anguste lanceolatis acuminatis serratis subtus pallidis, pedunculis erectis crassis bis terve divisis simplicibusve, bracteis dissitis lanceolatis, floribus magnis, sepalis amplis late ovatis acuminatis, labello magno late infundibuliformi in calcar conicum apice circinatum attenuato, alis amplis, vexillo dorso alato.

Var. β. Foliis latioribus ellipticis v. ovato-lanceolatis nervis numerosis.

Hab. Umbrosis montibus Khasia regione temperata et subtropica alt. 5000 ped.! *J. H. & T. T.*—Var. β. Nepalia maxime orientali, alt. 4000–5000 ped.! *J. H.* (fl. Sept.–Nov.) (v.v.)

Species pulcherrima, caule crassiusculo simplici v. diviso 4–8″. *Folia* basi interdum setigera, nervis primariis in var. *a* paucis sub 8, margine parallelis, in var. *β*, 8–12, divergentibus. *Flos* 1½″ longus, pallide roseus v. stramineus, rubro striatus. *Capsula* elliptico-oblonga, erecta, polysperma. *Semina* parva, lanata?—*Flores* interdum solitarii. *Capsulæ* et semina *I. linearis.*

This is similar in some respects to *I. acuminata*, Benth., but differs in the flowers being considerably larger, not umbellate, and the leaves broader; the sepals and petals also are of a very different form.

59. I. FRUTICOSA (*D.C. Prodr.* i. 687; *Wall. Cat.* 4762!). Caule erecto robusto ramoso, foliis 3–5″ longe petiolatis pubescentibus subsericeis glabratisve ovato lanceolatis acuminatis serratis crenatisve, petiolis 1–2 glandulosis tomentosis, pedunculis glabris folio brevioribus 3–5-floris, bracteis linearibus, pedicellis valde elongatis gracilibus, floribus amplis, sepalis magnis ovatis cuspidatis, labelli limbo brevi cymbiformi, calcare elongato curvo ascendente, vexillo late orbiculari bilobo, alis bipartitis segmentis divaricatis.—*Wight & Arn. Prodr.* 137; *Wight, Ic.* 966.

Hab. Sylvis montosis tropicis Malabariæ ad Kottergherry et Coonoor! (non alibi), *Wight* (fl. Aug. et Mart.).

Planta insignis, 8-pedalis, floribunda. *Caulis* ad cicatrices nodosus. *Folia* interdum glabra, sæpissime appresse pubescentia, glandulis petioli sessilibus. *Flores* 1½″ lati, calcare 2-unciali. *Pedunculi* plerumque in pedicellos 3, 2–4 unciales divisos, vel umbellam 2–4-florem gerens. *Capsula* magna, ¾″ longa, anguste elliptica, rostrata, polysperma. *Semina* glabra.

60. I. JURPIA (*Ham. Wall. Cat.* 4761!). Fruticosa, caule elato ramoso, foliis 3–5″ petiolatis oblique ovatis ovato-lanceolatisve longe acuminatis serratis nervis subtus puberulis basi petioloque glandulosis, pedunculis axillaribus subterminalibusque gracilibus 2–4-floris, sepalis parvis, vexillo dorso cornuto, labello subconice saccato ventricoso in calcar subelongatum validum curvum contracto, alis labello minoribus.

Var. *β*. Mutica, calcare et cornu vexilli brevioribus.

Hab. Sylvis umbrosis tropicis Himalayæ centralis et orientalis, Nepal! *Hamilton, &c.*; Sikkim, alt. 3000–5000 ped.! *Griffith, &c.* (fl. Sept.–Nov.). (v.v.)

Caulis 5–8 pedalis, ramosus, crassiusculus, basi sublignosus; ramulis pubescentibus glabrisve, plerumque flexuosis. *Folia* submembranacea, supra nitida, glaberrima v. pilosula, setis glanduligeris basin versus gracilibus. *Pedunculi* 3–5″, glabri v. puberuli. *Bracteæ* caducæ. *Pedicelli* pollicares et ultra. *Flos* sordide albidus v. flavus v. aurantiacus, cum calcare rubro 2-pollicaris. *Sepala* acuta obcuneata dorso longe rostrata v. erostria. *Capsula* anguste lineari-oblonga, pollicaris, glaberrima. *Semina* pauca, 4–6 apicem versus capsulæ, parva, opaca, suborbicularia, tuberculata.

61. I. PUBERULA (*De Prodr.* i. 687; *Wall. Pl. As. Rar.* ii. 193; *Cat.* 4767 A). Plus minusve pubescens v. glabrata, caule elongato simplici v. ramoso, foliis 1–5″ in petiolum attenuatis elliptico- v. ovato-lanceolatis utrinque acuminatis crenatis eglandulosis, pedicellis bracteolatis 1–4-floris solitariis v. binis gracilibus erectis axillaribus subterminalibusque floribusque violaceis pubescentibus, sepalis majusculis ovatis acuminatis, labelli limbo cymbiformi, calcare longo gracili curvo, alis patentibus, capsula lineari.

I. mollis, *Wall. in Roxb. Fl. Ind.* ii. 461.—I. hispidula, *Bth. Wall. Cat.* 4740!—I. insignis (in part.), *Wall. Cat.* 4766.

β. Pedunculis 2–4-floris.

Hab. Sylvis subtropicis temperatisque Himalayæ orientalis et centralis; Nepal! *Wallich*; Sikkim, 3000–6000 ped.! *J.D.H.*—*β. Mont.* Khasia, alt. 5000–6000 ped.! *J. H. & T. T.* (fl. June–Dec.). (v.v.)

Species variabilis, erecta, 1–3-pedalis; caule simplici v. parce ramoso. *Folia* basi non ciliata v. setigera. *Pedunculi* 1–3 pollicares, basi bracteati. *Flores I. flaccidæ*? subsimiles. *Calcar* gracile, ½″. *Capsula* glaberrima, pollicaris. *Semina* (immatura) parva?.

In all Wallich's Nepal and our Sikkim specimens the peduncles are 1-flowered, in our Khasia ones 2–4-flowered.

c. Perennes. Epiphyticæ. *Caules* breves, crassi. *Folia* versus apices ramorum conferta. *Pedunculi* 2–3-flores. *Capsulæ* breves, rostratæ.

62. I. JERDONIÆ (*Wight in Madr. Journ. Sc.* v., *Ic.* t. 1602). Epiphytica, glaberrima, caule brevi procumbente radicante, ramis floriferis ascendentibus, foliis gracile petiolatis ovatis acutis sinuato-subserratis sinubus et apice setulosis, pedicellis gracilibus pedunculo longioribus, sepalis lanceolatis, labello longe saccato ventricoso, calcare brevi incurvo.—*Hook. Bot. Mag.* 79, t. 4739.

Hab. Ramis truncisque arborum Mont. Anamallay et Nilghiri ad Sispara Ghat.! *Wight.*

Rami cicatricati. *Folia* 1½–2½″ longa, petiolo ½–¾″, utrinque glaberrima. *Pedunculi* cum pedicellis folia æquilonga. *Flores* rubri, labellum magnum inflatum, fere pollicare, vexillum alæque parvæ. *Sepala* petalis æquilonga, alæ oblique bilobæ, lobis imbricatis rotundatis. *Vexillum* galeatum.

This, as Wight observes, is most nearly allied to *I. Walkeriæ*. The latter I have been obliged to put in the racemose group of the order, though, with the present and two following, it forms the most natural section of the genus.

63. I. AURICULATA (*Wight in Madr. Journ. Sc.* v. p. 8. t. iii.). Epiphytica, glaberrima, caule brevi crassissimo nodoso articulato, foliis petiolatis ovatis ellipticisve acutis subserratis, pedunculis brevibus 2-floris, pedicellis gracilibus, sepalis maximis dependentibus, vexillo brevi concavo profunde bifido, labello longe saccato apice breviter calcarato.

Hab. Peninsulæ montibus prope Courtallam! *Wight.*

Species valde singularis, *I. Jerdoniæ* arcte affinis sed caulibus crassioribus sæpe nodosis, pedunculis brevioribus, sepalis labello æquilongis, et calcare breviore.

64. I. VIRIDIFLORA (*Wight in Madr. Journ. Sc.* v. p. 9). Glaberrima, caule brevi crassissimo ramisque nodulosis, foliis crasse petiolatis ovato-lanceolatis acutis serratis, pedunculis brevibus bifloris, pedicellis gracilibus, sepalis linearibus, vexillo alte bilobo dorso alte carinato, labello conice subsaccato in calcar incurvum angustato.

Hab. Malabar ad Mont. Shivagherry! *Wight.*

I. auriculatæ et *I. Jerdoniæ* arcte affinis; sed caule crassiore, foliis majoribus, 3″ long, nervis validioribus, sepalis lanceolatis, labelloque vix saccato sed in conum incurvum apice uncinatim calcaratum sensim attenuatum.

F. UMBELLATÆ et CAPITATÆ (vide p. 113).

Vide *I. Goughii, trilobata, sulcata,* &c., in § C; *I. longicornu, racemosa,* et *bicornuta* in § G.

65. I. BRACTEATA (*Coleb. MSS. in Roxb. Fl. Ind. Ed. Carey,* ii. 458; *Wall. Cat.* 4760!). Glaberrima, caule erecto parce ramoso, foliis longe petiolatis ovato-lanceolatis utrinque acuminatis subserratis basi ciliatis, pedunculo terminali apice densifloro, bracteis magnis recurvis crinitis, floribus purpureis.

I. fimbriata, *Hook. Exot. Flor.* ii. t. 146.

Hab. Mont. Khasia paludibus subtropicis temperatisque, alt. 4000–6000 ped.! *De Silva, Griffith,* &c. (fl. Jun.–Aug.). (v.v.)

Planta pulcherrima, pedalis et ultra ob. bracteas crinitas distinctissima. *Flores* purpurei. Exemplaria depauperata ludunt floribus fere ebracteatis v. bracteis subulatis.

66. I. JANTHINA (*Thwaites, En.* p. 68). Herbacea, pusilla, simplex, glaberrima, foliis 1–4 membranaceis ovatis late oblongisve acuminatis denticulatis, petiolo eglanduloso, sepalis oblongis subacutis, vexillo rotundato, labello, infundibuliforme in calcar incurvum sensim producto.

Hab. Ceylon! *Walker,* regione tropica, *Thwaites.*

Species parvula, 3–5-pollicaris. *Folia* sæpissime 2 opposita 1–4″ long. ½–2 lat. *Pedunculus* 2–3″. *Pedicelli* breviter racemosi, bracteis ovalibus persistentibus. *Flores* pulchre violacei, $\frac{1}{2}$–$\frac{3}{4}$″ lat. *Capsula* polysperma.

67. I LEUCANTHA (*Thw. En.* p. 67). Herbacea, pusilla, simplex, foliis approximatis lanceolatis acuminatis denticulatis parce pilosis basin versus petioloque subalato glanduloso-setigeris, labello in calcar æquilongum rectum conicum apice (siccum) subabrupte attenuatum producto, alarum lobo posteriore parvo lanceolato, anteriore multo majore inæqualiter 3-partito apicibus rotundatis.—*Descr. Ex. Cl. Thwaites.*

Hab. Hinidoon and Kittoot Gala in Ceylon, *Thwaites.*

"Ab *I. appendiculata,* quæ valde similis affinisque calcaris petalorumque forma præcipue differt. *Flores* albi, sepalo anteriore rufo-galeato."—*Thw.*

I have not seen Thwaites' specimens, but fear I may have confounded this species with *I. appendiculata.*

68. I. LINEARIS (*Arn. in Hook. Comp. Bot. Mag.* ii. 323). Humilis, glaberrima, caule simplici robusto, foliis approximatis anguste lineari-lanceolatis acuminatis serratis subcoriaceis, bracteis ovatis acuminatis, pedicellis filiformibus, sepalis breviusculis ovatis acuminatis, labello concavo brevissime calcarato, vexillo brevi dorso cornuto, alis magnis bipartitis segmento laterali minore terminali magno obovato unguiculato.

Var. *β.* Foliis petiolatis elliptico-lanceolatis.

Hab. Sylvis montosis subtropicis Ceyloniæ, alt. 4000–6000 ped.! *Walker,* &c.

Caules subcæspitosi, 4–6″. *Folia* 2–3″ in petiolum brevem angustata. *Flores* ⅜″ longi. *Capsulæ* ellipticæ, glaberrimæ.

69. I. APPENDICULATA (*Arn. in Hook. Comp. Bot. Mag.* ii. 323.). Herbacea, pusilla, glabra v. pilosula, foliis approximatis v. verticillatis petiolatis ovatis lanceolatisve utrinque acuminatis setuloso-serratis membranaceis, pedunculis elongatis, bracteis lanceolatis, pedicellis filiformibus, sepalis ovatis oblongisve, labello parvo saccato apice breviter calcarato, vexillo parvo gibbo, alis bipartitis.—*Thwaites, En.* 47.

α. Foliis oblongo-lanceolatis acuminatis, pedunculis folia superantibus.

β. Foliis ovatis, pedunculis foliis brevioribus.

γ. Foliis 3–5 ovatis verticillatis pubescentibus.

δ. Foliis verticillatis anguste elliptico-lanceolatis.

Hab. Sylvis montosis subtropicis Ceyloniæ! *Walker,* &c.

Species parvula, variabilis, 4–8″. *Folia* flaccida, 1–6″. *Flores* valde membranacei, "albidi v. pallide rosei; vexillum transverse rubro-striatum, alis bilobis; lobo, antico parvo lanceolato longe caudato, posticis majore, semicordato acuminato."—*Thw.*

70. I. UMBELLATA (*Heyne in Roxb. Fl. Ind. Ed. Wall.* ii. 464; *Wall. Cat.* 4759!). Humilis, caule simplici longe nudo, foliis breve petiolatis subverticillatis ovatis obtusis acutisve crenato-serratis, pedunculis erectis foliis subæquilongis, bracteis oblongis obtusis, floribus amplis, sepalis late ovatis acutis, labelli lamina parva cymbiformi, calcare elongato gracili incurvo, vexillo orbiculari emarginato, alis subhorizontaliter patentibus bilobis lobis obtusis.—*Wight & Arn. Prodr.* 137; *Wight, Cat. N.* 745; et in *Madr. Journ. Sc.* v. p. 9. t. iv.

Hab. Sylvis tropicis montosis Malabariæ, prope Courtallum! *Wight* (fl. Aug.–Sept.).

Herbacea, 4–12″, glabra. *Radix* tuberosa (ex *Wight*). *Folia* 1–4″, obtusa, crenata. *Flores* 5–6, sub ⅔ lati. *Capsula* breviter elliptica, glabra. *Semina* echinata (*Wight*).

71. I. SUBCORDATA (*Arn. in Hook. Comp. Bot. Mag.* ii. 323). Caule simplici longe nudo v. basi repente ramoso, foliis longe petiolatis ovatis v. ovato-lanceolatis subacutis v. acuminatis basi cordatis rotundatisve grosse crenatis, pedunculis folio brevioribus, bracteis ovato-lanceolatis acuminatis, pedicellis gracilibus, sepalis oblongo-ovatis acuminatis majusculis, labelli lamina cymbiformi acuminata calcare elongato acuminato gracili incurvo, alis latis.—*Thw. En.* 67.

Hab. Sylvis montosis subtropicis Ceyloniæ, alt. 5000–6000 ped.! *Walker*, &c. (fl. Sept., Oct.).

Species variabilis. *Caules* 4–10″. *Folia* 1–3″, obtusa v. acuta, petiolo elongato. *Flores* albidi, sepalis rufescentibus. *Capsula* parva, ⅓ unc. longa.—*I. umbellatæ* valde affinis, differt bracteis acutioribus foliisque basi cordatis v. rotundatis.

72. I. UNCINATA (*Wight in Madr. Journ. Science,* v. p. 11. t. vi., *Icones*, t. 747). Caule erecto, foliis 2–3″ longe petiolatis ovatis ovato-cordatisve acuminatis serratis supra nervis pubescentibus subtus glaberrimis, petiolo apice glanduloso, pedunculis axillaribus elongatis erectis, bracteis parvis, floribus 4–8 mediocribus approximatis, pedicellis brevibus, sepalis amplis oblique ovatis acuminatis, labello subhemispherico calcare brevi ventricoso basi constricto apice uncinato, vexillo oblongo, alis bipartitis.

Hab. Sylvis tropicis Malabariæ, ad Courtallam! *Wight* (fl. Aug., Sept.).

Caules graciles. *Petioli* 1–2″. *Pedunculi* foliis breviores, 3–4″. *Pedicelli* ½″. *Flores* sub 1″ longi. *Alæ* lobo antico minore horizontaliter patente, postico semiovato obtuso. *Capsula* brevis, rostrata, oligosperma.

73. I. VISCIDA (*Wight in Madr. Journ. of Science,* v. p. 12, *Icones*, t. 746). Caule gracili erecto basi repente radicante angustato, foliis 2–3″ longe petiolatis ovatis acuminatis serratis nervis utrinque hispidulis, pedunculis axillaribus erectis filiformibus viscidis 2–4-floris, bracteis majusculis ovatis acuminatis, pedicellis breviusculis approximatis, floribus majusculis, sepalis amplis late ovatis longe acuminatis, labello brevi cymbiformi calcare longo gracili incurvo, vexillo oblongo acuminato, alis bipartitis lobis, semiovatis.

? An I. cordata, *Wight in Madr. Journ. Sc.* v. p. 10.

Hab. Montibus subtropicis Pulney Malabariæ, alt. 5500 ped.! *Wight.*

Caulis ut videtur flexuosus. *Petioli* 1–3″. *Pedunculi* 4–5″, graciles. *Bracteæ* ¼″ longæ. *Flores* rosei v. purpurascentes. *Capsula* elliptica, acuta, polysperma. *Semina* orbiculata, pilosa.

The *I. cordata*, Wight, from Dr. Wight's specimens, collected in the Shevagherry Hills, appears to differ from *I. viscida* only in the subcordate base of the leaves.

74. I. ACUMINATA (*Benth. in Wall. Cat.* 4754 !). Humilis, glaberrima, caule crasso simplici, foliis approximatis longe lanceolatis in petiolum angustatis acuminatis sinuato-crenatis subcoriaceis subtus glaucis nervis margine subparallelis, pedunculis axillaribus crassiusculis, bracteis magnis late ovatis obtusis, floribus magnis, sepalis majusculis oblique ovato-cordatis obtusis acuminatisve, labello limbo cymbiformi acuminato, calcare elongato sensim angustato incurvo, vexillo orbiculato, alis bipartitis.

Var. *α*. Foliis lanceolatis longius petiolatis apice elongatis.

Var. *β*. Foliis angustioribus interdum 6-pollicaribus.

Hab. Rupibus madidis Mont. Khasia regione subtropica, alt. 4000–5000 ped.! *De Silva,* &c. (fl. Aug., Sept.). (v.v.)

Habitu *I. lineari* proxime affinis, sed major floribusque diversissimis. *Caules* cæspitosi, 5–14″, stricti, erecti. *Folia* ½–1″ lata, subtus pallida. *Flores* speciosi, pallide rubri, pollicares. *Capsulæ* breves, erectæ, ½″, oblongæ, subacutæ. *Semina* minima, lana fusca immersa!

75. I. HOOKERIANA (*Arn. in Hook. Comp. Bot. Mag.* ii. 324). Fruticosa, perennis, ramis crassis, foliis petiolatis carnosulis 3–6″ ovalibus acutis acuminatisve crenato-serratis, petiolis apice biglandulosis, pedunculis robustis erectis elongatis, floribus maximis 4–6 longe pedicellatis umbellatis, sepalis majusculis oblongo-lanceolatis, labelli limbo parvo cymbiformi abrupte in calcar crassum elongatum attenuatum contracto, petalis amplis, vexillo orbiculari.—*Bot. Mag.* 79, t. 4704.

? I. biglandulosa, *Moon, Cat.* 18.

Hab. Montibus tropicis Ceyloniæ, alt. 3000–5000 ped., *Walker,* &c.

Species magnifica, elata, glaberrima. *Rami* crassitie digiti. *Petioli* 2–5″, apicem versus glandulis 2-stipitatis. *Folia* multinervia. *Pedunculi* crassi, 4–6″. *Bracteæ* deciduæ. *Pedicelli* 1–2″. *Flores* speciosi, 2″ lati, calcare interdum 2″ curvo; petalis lateralibus et vexillo subæqualibus, margine crispatis, albis? rubro-striatis. *Capsula* pro planta parva, ¾″ elliptico-lanceolata gibba, glabra.

76. I. grandis (*Heyne in Wall. Cat.* 4759 !).—*Arn. in Hook. Comp. Bot. Mag.* 324, *Madr. Journ. of Science,* v. t. iv.

Hab. Mont. tropicis Malabariæ! *Heyne,* et ? Ceyloniæ, *Walker.*

Omnia *I. Hookerianæ,* sed labello conico-infundibuliformi in calcar 2-pollicare sensim attenuatum, et petalo postico minore.

Thwaites suspects that this does not differ specifically from *I. Hookeriana,* and I have no doubt that he is right.

77. I. CAMPANULATA (*Wight in Madr. Journ. of Sc.* v. 11. t. vii., *Icones,* t. 744). Erecta, caule robusto, foliis 4–6″ petiolatis late ovato- v. elliptico-lanceolatis acuminatis setuloso-serratis subtus glaucis, pedunculis axillaribus crassiusculis suberectis 3–4-floris foliis brevioribus, floribus umbellatis, bracteis magnis ovato-lanceolatis, floribus magnis, sepalis

amplis oblique ovatis rostrato-acuminatis, labello parvò cymbiformi calcare perbrevi incurvo, vexillo orbiculari mucronato, alis bipartitis.

Hab. Montibus subtropicis Pulney Malabariæ, alt. 5500 ped., *Wight.*

Caulis subramosus, herbaceus. *Folia* eglandulosa. *Pedunculi* 3″. *Bracteæ* ½–¾″. *Flores* 1¼″ longi, subcampanulati, pallide purpureo-maculati. *Capsula* elliptica, utrinque attenuata, glaberrima. *Semina* plurima, creberrime echinata.

Very similar in many points to *I. lævigata,* but the common peduncles of the flowers are much longer, and the habit is very different.

78. I. LÆVIGATA (*Wall. Cat.* 4753 !). Caule elato robusto fruticoso, foliis 4–6″ breve v. longe petiolatis oblongo- v. obovato-lanceolatis longe acuminatis late crenato-serratis basi petiolove glandulosis, pedunculis axillaribus terminalibusque brevibus 2–3-floris, floribus flavis, bracteis oppositis sepalisque amplis late ovatis rotundatisve acuminatis, labello conice saccato ventricoso calcare breviusculo uncinato terminato.

Hab. Sylvis umbrosis subtropicis tropicisve Himalayæ orientalis ad Sikkim, alt. 2000–4000 ped. ! Montibus Khasia, alt. 3000–5000 ped. ! *De Silva,* &c. (fl. Jul.–Oct.). (v.v.)

Caulis 4–6-pedalis, lignosus, ramosus; ramis nodosis, glabris puberulisve. *Folia* basi sæpius obliqua, luride viridia. *Pedunculi* ½–1″, robusti. *Flores* subcampanulati, flavi v. sordide straminei, rubro-striati, 1–1¼″ longi. *Capsula* ignota.

Species ob staturam, ramos lignosos, pedunculos breves 2–3-flores, bracteas magnas, flores flavidos, sepala ampla facile recognita.

A tall branched suffruticose species, with much of the habit of *I. Jurpia,* but readily distinguished by the large orbicular outer sepals.

79. I. TAVOYANA (*Benth. Wall. Cat.* 4773 !). Humilis, caule crassiusculo basi nudo, foliis 3–3″ petiolatis ovatis acutis v. longe acuminatis integerrimis v. remotiuscule setoso-serrulatis basi longe setosis, pedunculis gracillimis foliis longioribus 8–14-floris, bracteis setaceis, pedicellis gracilibus; floribus parvis, sepalis subulatis, labello cymbiformi purpureo striato calcare recto subulato æquilongo, alis longe unguiculatis, capsula parva angusta lanceolata utrinque attenuato-acuminata oligosperma.

I. Tavagua, *Benth. sphalm. in Steud. Nomen.*

Hab. Peninsula Malayana ad Tavoy Gomez, Moulmein ! *Lobb.*

Species elegans, parviflora, *Circeæ* habitu, glaberrima. *Caules* simplices v. ramosi, 3–6″. *Folia* pallide viridia, nitida, ut videtur flaccide membranacea; nervis paucis tenuibus. *Pedunculi* 3–4″. *Pedicelli* capillares, pollicares. *Flores* pallide straminei vix ¼″ longi, vexillo ut videtur dorso breviter rostrato; alarum lobo terminali semiobovato, apice uncinato. *Capsula* sub ⅓″ longa, torulosa, 2–3-sperma. *Semina* oblonga, compressa, opaca.

G. Racemosæ (vide p. 113).

§ a. *Racemi* multiflores, pedicellis interrupte verticillatis, v. fasciculatis.

80. I. racemosa (*Wall. Cat.* 4730! in part., non *Don, Prodr.*). Glaberrima, caule gracili simpliciusculo erecto, foliis 3–5″ petiolatis lanceolatis v. elliptico-lanceolatis utrinque acuminatis apice caudatis grosse crenatis, pedunculis elongatis strictis gracilibus multifloris pedicellis verticillatis gracilibus bracteis parvis ovato-subulatis, sepalis minimis labello longe conice saccato in calcar curvum attenuato, vexillo orbiculato, alarum lobo terminali brevi v. elongato ligulato v. caudato; capsula lineari.—? *Edgeworth in Linn. Trans.* xx. 41.

I. micrantha, *Don, Prodr.* 205?

β?. Floribus majoribus, lobo terminali petalorum ligulato porrecto.

γ, *polyceras*. Bracteis majoribus sepalis apice labelli et dorso vexilli in cornu glanduloso-incrassatum productis.

Hab. Sylvis Himalayæ temperatæ, alt. 7000–10,000 ped., Nepal! *Wallich*; Sikkim! *J. D. H.*; β, Sikkim! alt. 7000–10,000 ped., et in Montibus Khasia, alt. 5000–7000 ped.! *J. H. & T. T.* (fl. Jul.–Sept.). (v.v.)

Herba 2–4-pedalis. *Folia* 4–6″, grosse crenata, sinubus setigeris, petiolis basi sæpe glanduligeris. *Racemi* 3–6″, stricti, pedicellis 1″, verticillatis. *Bracteæ* basi ovatæ, apice sæpius elongato glanduloso-incrassato. *Flores* sub ¼–⅓″ longi, pallide flavi v. pallide sordide lilacini. *Calcar* rectum v. paulo curvum, interdum apice bifidum. *Capsula* ¾–1″, apiculata, æqualis, teretiuscula. *Semina* opaca.—Variat ut videtur lobo inferiore alarum brevi v. elongato et porrecto.

Under *I. racemosa* in Wallich's Herbarium there are at least three plants, viz., the *I. leptoceras* and two others, which appear to differ chiefly in the racemes of one being interruptedly whorled, and of the other continuous: as Mr. Edgeworth has described the latter under the name of *I. tingens*, I have retained Wallich's name for the former.

The *I. tingens*, Edgeworth, appears to differ in no respect from this and from specimens marked *I. racemosa* in *Wall. Herb.*, except in the flowers not being verticillate, and in the remarkable character of the posticous lobes of the lateral petals (alæ) being included in the spur, which I cannot but regard as an anomalous character. The whorled pedicels, numerous long erect racemes, small flowers and straight spur best distinguish *racemosa*. The var. γ approaches very closely *I. leptoceras*, var. θ; γ is distinguished only by the whorled inflorescence.

81. I. bicornuta (*Wall. in Roxb. Flor. Ind.* ii. 461, *Cat.* 4729 & 4765 in *Herb. Henslow*). Erecta, ramosa, foliis amplis approximatis ovato-acuminatis grosse crenato-serratis, racemis confertis erectis elongatis interruptis, pedicellis fasciculatis verticillatisque, floribus 1″, lilacinis, sepalis late ovatis, labello inflato incurvo ascendente ore apicem versus in cornu producto, calcare brevi recurvo, capsula cylindrica.

I. longicornu, *Str. & Wint. Herb.* no. 4.

Hab. Himalaya centrali et occidentali Garwhal! *Strachey & Winterbottom*; Nepal! *Wallich* (fl. temp. pluv.).

A large-leaved, membranous, flaccid, very much branched species, but distinguished by the inflated saccate incurved labellum, rather suddenly terminating in a short recurved spur, as also by the long, erect, slender racemes, with whorled peduncles, slender capsules, and large pale lilac flowers. The petals terminate in long slender tails.

82. I. LONGICORNU (*Wall. Cat.* 4729, non *Flor. Ind.*). Erecta, ramosa, glabra, foliis alternis ovatis ovato-lanceolatisve glanduloso-stipulatis grosse crenato-serratis dentibus setigeris, pedunculis lateralibus et versus apices ramulorum fasciculatis erectis strictis elongatis multifloris, floribus versus apices pedunculi corymbosis racemosisve 1″ long. bracteis ovato-subulatis, sepalis parvulis oblique ovatis, labello longe saccato obtuso v. conico v. abrupte cornuto, capsula lineari-elongata recta stricta cum pedunculo directione continua.

α. Labello conice saccato, in calcar gracile incurvo attenuato.—I. longicornu, *Wall. Cat.* 4729, *Herb. Henslow et Lindley.*

β, *umbrosa*. Labello subcylindrice saccato in calcar breve tenue incurvum abrupte desinente.—I. umbrosa et I. amphorata, *Edgew. in Linn. Trans.* xx. 39; I. picta, *Floral Cabinet*, t. 128, fid. *Herb. Lindley*: ad *I. sulcatam* tendit.

γ, *cristigera*. Labello ut in *α*, floribus luteis aureisve rubro-venosis.—I. cristigera, *Edgw. MSS.* an sp. distincta?

δ, *bicolor*. Labello inter *α* et *β* media, petalisque aureis, petalo antico roseo.—I. bicolor, *Royle, Ill.* p. 151. t. 28.

ε, *pallens*. Floribus minoribus pallidis, labello ut in *α*.—I. pallens, *Edgw. in Linn. Trans.* xx. 39.

Hab. In Himalaya temperata media et occidentali, alt. 5000–10,000 ped., ad Nepal! *Wallich*, ad Marri! *Fleming*.—Var. *α*, Nepal! ad Marri! *β*, in Himalaya boreali occidentali tota; var. *γ*, in Kulu! *Edgeworth*, et Kashmir! *T. T.*; var. *δ*, Simla et Mussooree, *Royle*; var. *ε*, Garwhal, 4000–8000 ped.! *Edgeworth* (fl. temp. pluv.). (v.v.)

The *I. longicornu* of Wallich in Roxburgh's 'Flora Indica,' is not the plant of his Herbarium, no. 4729 in *Herb. Lindley et Henslow*, which latter differs from his description in the leaves being broader, not crowded towards the ends of the branches, nor linear-lanceolate; nor does it agree with Wallich's description in being a fleshy species with approximate ventricose joints, a leafy subfastigiate panicle, and an exceedingly long filiform spur thrice the length of the pedicel, all which characters agree much better with *I. insignis*, Wall. The yellow fragrant flowers of the *I. longicornu*, described in 'Flora Indica,' are, however, unlike *I. insignis*, and suggest its being the *I. odorata*, Ham. (in *Don, Prodr.* 203), in the *I. leptoceras*, Wall., of which one Nepal specimen in Herb. Henslow (4760) well agrees with Wallich's character of *I. longicornu*. It is evident, I think, that three species have become mixed up

in Wallich's published description, 'Catalogue,' and original Nepalese MSS., and that these three include that to which we now confine the name of *longicornu* together with *I. leptoceras* and *I. insignis.*

The best characters for this species are the erect branching habit, alternate leaves, long erect peduncles, with subumbellate or shortly racemose large flowers, small lateral sepals, and the labellum well developed into a long sac, which is either conical or broadly cylindric and blunt, ending in a slender spur, and especially by the narrow capsule, which forms a straight line with the peduncle, and is neither inclined nor nodding. The flowers vary greatly in number, dimensions, and colour. Small states are difficult to distinguish from various congeners, according as their habit and the colour of the flowers inclines to one or another, as to *I. laxiflora, bicornuta, sulcata,* and *Roylei.* When the flowers are simply racemose, it is not easy to distinguish this from *I. laxiflora.*

b. *Racemi* continui (non interrupti v. verticillati) pedicellis plerumque alternis. *Calcar* elongatum.

* *Malabar et Ceylon.*

83. I. MACULATA (*Wight in Madr. Journ. Sc.* vii. 12). Caule ramoso sicco profunde sulcato piloso, foliis alternis longe petiolatis estipulatis ovato-lanceolatis serratis utrinque pilosis junioribus subtomentosis, pedunculis robustis rigidis elongatis multifloris, pedicellis horizontalibus, sepalis magnis late ovato-oblongis, vexillo parvo, labello conico in calcar gracile elongatum desinente, capsula brevi.

Hab. Malabar ad Mont. Shevagherry! *Wight* (fl. Aug.).

Species pulchra, *I. elongatæ* et *cornigeræ* affinis, caulibus foliisque longe albo-pilosis racemisque validis elongatis multifloris facile distinguenda. *Caules* 2–3-pedales? sicco rigiduli, flavi, profunde sulcati. *Folia* cum petiolo 1–2-pollicari, 4–6″ long., 1½–2″ lat., membranacea, subobtuse serrata, basi nuda v. secus petiolum glandulis magnis sessilibus stipitatisve ornatis. *Racemi* interdum spithamæi, pedunculo stricto simplici v. diviso, bracteis brevibus late ovatis, pedicellis gracilibus, ¾–1″. *Flores* cum calcare subpollicares. *Capsula* ½″ long., medio turgida, acuminata, glabra. *Semina* pilis brevibus pustulata.

84. I. WALKERI (*Hook. Comp. Bot. Mag.* ii. 324. t. xviii.). Erecta, subramosa, foliis 2–3″ ovato-lanceolatis utrinque acuminatis setoso-serrulatis, pedunculis folio sublongioribus 6–8-floris, bracteis late ovatis acutis, pedicellis gracilibus elongatis erectis, floribus pollicaribus coccineis, sepalis parvis ovato-cordatis, labello longe late ventricoso incurvo brevissime calcarato, alis parvis bipartitis.

Hab. Sylvis subtropicis montosis Ceyloniæ, alt. 5000–6000 ped.! *Walker,* &c.

Species distinctissima ob sepalum posticum longe ventricosum saccatum incurvum petalaque parva coccinea. *I. Jerdoniæ* proxime affinis.—*Caules* 1–2-pedales.

85. I. ELONGATA (*Arn. in Hook. Comp. Bot. Mag.* ii. 324). Caule robusto, foliis 2–3″ approximatis petiolatis lineari- v. ovato- v. obovato-lanceolatis ellipticisve acuminatis argute serratis coriaceis, pedunculo longissimo robusto, racemo elongato, bracteis ovatis oblongisve subacutis, sepalis ovato-oblongis acuminatis, labello cymbiformi calcare gracili elongato incurvo, vexillo parvo, alis bilobis, capsula brevi elliptica.—*Thwaites, En.* p. 67.

Hab. Sylvis montosis subtropicis Ceyloniæ! alt. 3000–4000 ped., *Walker*, &c.

Species distinctissima, pedalis et ultra. *Folia* subcarnosa, subtus pallida, minute punctulata, nervis validis. *Pedunculus* 6″. *Racemus* 3″. *Flores* 1″, rubri. *Alarum* lobus anticus parvus, sepalis æquilongus, postico "multo majore oblique rotundato."—*Thw.*

86. I. CORNIGERA (*Arn. in Comp. Bot. Mag.* i. 323). Glaberrima, caule simpliciusculo longe nudo, foliis 3–6″ ellipticis lanceolatisve obtusis longe acuminatisve in petiolum brevem angustatis crenatis sinubus setuligeris subtus pallidis, pedunculis elongatis multifloris, bracteis late ovatis acutis, pedicellis gracilibus, floribus flavis (cum calcare ¾″ long.), sepalis parvis ovato-cordatis acuminatis, labello infundibuliformi in calcar mediocri apice circinato attenuato, vexillo obovato acuto.—*Thw. En.* p. 67.

Hab. Sylvis montosis subtropicis Ceyloniæ; alt. 2000–4000 ped.! *Walker, Gardner*, &c.

Species primo intuitu calcare apice circinato, et capsula brevi oligosperma valde distincta, sed foliis variabilis. *Caulis* pedalis. *Folia* interdum late elliptica grosse crenata subtus subglabra, petiolo ½–1″. *Pedunculi* foliis longiores. *Racemus* regularis, floribus nempe subæquidistantibus, bracteisque omnibus consimilibus. *Pedicelli* vix 1″, patuli. *Flores* membranacei. *Capsula* brevis, ⅓″ longa, compressa, elliptica, utrinque acuminata, oligosperma. *Semina* 2, orbicularia, compressa, nitida.

The habit of this is that of *I. uncinata, subcordata*, and others of the umbellate section, but the inflorescence is decidedly racemose.

**** *Mont. Himalaya et Khasia.*

87. I. INSIGNIS (*DC. Prodr.* 1688; *Wall. Plant. As. Rar.* ii. p. 83. t. 194, *Cat.* 4760! bis!). Caule simpliciusculo robusto erecto, foliis (6-poll.) subcoriaceis lineari v. oblongo-lanceolatis basi attenuatis apice acuminatis grosse serratis dentibus apice setigeris, pedunculis 6–8 terminalibus robustis erectis elongatis 10–15-floris, bracteis caducis, sepalis amplis oblique ovatis aristato-acuminatis, labello conice saccato in calcar elongatum gracile attenuato.

I. racemosa, *Don! Prodr.* 203—I. insignis! *Wall. Cat.* 4766 e Nepal. in *Hb. Linn. Soc.*

Hab. Montes Sylhet, *Wall. in Herb. Linn. Soc.*! Himalaya centrali Nepal, *Wallich. fid. Plant. As. Rar.*

Species robusta, 2–3-pedalis, insignis. *Folia* angusta. *Flores* rosei. Cf. notulæ sub *I. longicornu.*

88. I. TINGENS (*Edgw. in Linn. Trans.* xx. 41!). Caule erecto gracili ramoso, foliis 2–4″ membranaceis ovatis lanceolatisve utrinque acuminatis apice caudatis crenatis dentibus basi setigeris, pedunculis numerosis lateralibus et subterminalibus gracillimis erectis multifloris, bracteis subulatis, pedicellis capillaribus, floribus parvis (¼–⅓″) flavis, sepalis parvis ovatis obtusis, labelli sacco conico in calcar mediocre rectum v. curvum sensim attenuato, vexillo orbiculari dorso mutico, alarum lobo terminali caudato.

I. micrantha, *Don, Prodr.* fid. *Arn. in Hb. Hook.*—I. racemosa, *Wall. Cat.* 4730 in part.

Hab. In Himalaya temperata tota, alt. 5000–12,000 ped. a Simla! *Comta. Dalhousie*; ad Sikkim! *J. D. H.*; Montibus Khasia, alt. 5000–7000 ped.! *Lobb*, &c. (fl. temp. pluv.). (v.v.)

Species distinctissima, etsi characteribus a sequenti ægre distinguenda. *Caules* 2–4-pedales. *Folia* basi glandulis crassis sæpissime stipulata. *Pedunculi* 2–4″, valde graciles (ut in *I. brachycentra*). *Pedicelli* ½″, gracillimi. *Flores* inter minimos. *Calcar* forma et longitudine varium. *Capsula* lineari-clavata, lævis, ¾″, acuminata. *Semina* pauca, minuta, atra, pyriformia, rugosa.

In some of the specimens I find the posticous lobes of the lateral petals (which are extremely variable in form and shape) included in the spur, as described by Edgeworth; in others they are free, and I am disposed to regard the former arrangement as owing to an anomalous form of the petals, which are normally simply and shortly 2-lobed, as in *I. racemosa* and others.

89. I. LONGIPES (*H. f. & T.*). Glaberrima, caule gracili elato ramoso, foliis (3–4″) alternis breve petiolatis ovato-lanceolatis longe acuminatis grosse crenatis sinubus setigeris, pedunculis subterminalibus axillaribusque longissimis gracillimis arcuato-patentibus apice racemosis 5–8-floris, bracteis lanceolatis caducis, pedicellis brevibus gracilibus, floribus flavis cum calcare pollicaribus, sepalis 2–4 parvis ovato-oblongis acutis, labello infundibuliformi in calcar subelongatum hamatum attenuato, alis in caudam tortam elongatis, capsula lineari.—An *I. urticifoliæ*, Wall. var.?

Hab. Sylvis temperatis Himalayæ, alt. 8000–10,000 ped.; Kumaon! *Str. & Wint.* (5); Sikkim! *J. D. H.* (fl. Jul.). (v.v.).

A tall branched delicate species, with alternate leaves and axillary, very long patent filiform arched peduncles, bearing at the very extremity three to six pale-yellow, narrow flowers, about 1¼ inch long, a good deal like some states of *I. leptoceras.* The labellum is of the form of a cornucopia, being a long slender cone or funnel, with an incurved slender spur. The lateral petals are linear, twisted, and as long as the spurred sepal. It differs from *I. urticifolia*, Wall. (of which I expect it is a variety), in the longer peduncles, smaller, more slender flowers, and form

of the spurred sepal and spur. Strachey and Winterbottom's specimen has much shorter peduncles than the Sikkim ones.

90. I. URTICIFOLIA (*Wall. in Roxb. Fl. Ind.* ii. 457, *Cat.* 4768). Glaberrima, caule elato gracili ramoso, ramis flexuosis, foliis sessilibus petiolatisque petiolo alato anguste ovato- v. oblongo-lanceolatis apice acuminatis vel caudatis crenato-serratis membranaceis, pedunculis lateralibus et terminalibus gracilibus patentibus folio brevioribus longioribusve 2–5-floris, pedicellis breviusculis bracteis, majusculis caducis, sepalis late ovatis acuminatis, labello saccato oblique conico ecalcarato vel calcare brevi incurvo subæquilongo terminato, alis caudatis, capsula lineari acuminata torulosa.

Var. *α*. Foliis ovatis, pedunculis lateralibus, floribus flavis, *Wall. Cat.* 4768 (*Herb. Henslow.*).

Var. *β*. Foliis ovato-lanceolatis longe caudato-acuminatis, pedunculis numerosis lateralibus terminalibusque 2–4-floris foliis brevioribus, floribus pallide cæruleis. (An una cum var. *γ* species distincta?)

Var. *γ*. Foliis ovato-lanceolatis grossius crenatis, pedunculis validioribus, bracteis elongatis, floribus albis v. pallide rubro-purpureis.

Hab. Sylvis umbrosis temperatis Himalayæ; *α*, Nepal! *Wallich*; *β*, Sikkim, alt. 8000–10,000 ped.! *γ*, Sikkim, 10,000–12,000 ped.! *J. D. H.* (fl. Aug.). (v.v.)

Species pulchra, 3–4-pedalis, vage ramosa. *Folia* longe caudato-acuminata et basi longe angustata; ob pedunculos sæpe 1-floros vel laterales et terminales inter hanc sectionem et § E osculat. *Petioli* non glanduligeri, nec basi stipulati. *Pedunculi* gracillimi, 1–3″, patentes. *Flores* mediocres, pallide cærulei. *Capsula* pollicaris, seminibus 1-seriatis. *Semina* magna, oblonga, fusca, testa lævi.

This is a very puzzling plant: Wallich's characters do not well agree with those of his no. 4768 in *Herb. Henslow* as to the leaves, which are shorter and broader than the description indicates. The flowers of the Nepal plant are yellow, but in the Sikkim varieties lilac, white, or purple. The leaves vary in size from 2–6 inches, and the peduncles, which are axillary and terminal, vary quite as much; generally they are very slender, patent, and filiform, but in var. *γ* often stout and erect, with large persistent subulate bracts. I find four lateral sepals in var. *γ*, of which the two accessory are often reduced to hairs. The spur is sometimes wholly absent in Sikkim specimens. The much greater size of the flowers, and their broad spurred labellum, sepal, and broad petals distinguish this from *I. longipes*, which is its nearest ally.

91. I. LEPTOCERAS (*DC. Prodr.* 1, 688, *Wall. Cat.* 4770). Glaberrima, caule erecto simplici v. ramoso folioso, foliis 2–5″ ovatis lanceolatisve utrinque attenuatis breve petiolatis setuloso-serratis, pedunculis axillaribus subterminalibusque erectis gracilibus, bracteis ovato-lanceolatis acuminatis, floribus (cum calcare) ¾–1″ longis, sepalis mediocribus late ovatis subulato-acuminatis, labello infundibuliformi in calcar gracillimum incurvum v. rectum attenuato, capsula gracili lineari-clavata.

I. longicornu, *Wall. MSS.* non *Cat.*, et *Flor. Ind. Ed. Carey*, ii. 462.—I. racemosa, *Wall. Cat.* in parte.

Var. *a.* Caule crasso nodoso, foliis anguste lanceolatis 2–5″, alarum lobo inferiore pendulo ter longiore quam lato latere gibbo.—I. leptoceras, *Wall. Cat.* 4770.—I. longicornu, *Wall. in Roxb. Flor. Ind.* ii. 462. —I. odorata, *Don, Prodr.* 213.

Var. *β.* Foliis ovatis 1–2″, alarum lobo inferiore lineari elongato obtuso.

Var. *γ.* Floribus flavis purpureo-maculatis.

Var. *δ.* Foliis lineari-lanceolatis floribus stramineis, alarum lobis rotundatis v. inferiore acuminato apices versus violaceis.

Var. *ε.* Foliis amplis flaccidis, floribus albis v. purpureo notatis, alarum lobo postico obtuse bilobo breviusculo.

Var. *ζ.* Foliis ovato-lanceolatis coriaceis, floribus aurantiacis, alis 3-lobis lobis brevibus.

Var. *η.* Foliis amplis pedunculum excedentibus, bracteis caducis, floribus sordide luteis rubro maculatis, alis bilobis lobo laterali breviter ovato acuto, inferiore longe subulato, sepalis 4.

Var. *θ.* Foliis amplis ovatis acuminatis, pedunculis numerosis folio longioribus, floribus pallide stramineis aurantiacisve, alis ut in *η*.

Hab. In Himalaya temperata tota a Sikkim, alt. 5000–10,000 ped.! *J. D. H.*; ad Simla! *T. T.* et in Mont. Khasia! alt. 5000–6000 ped., *Griffith*, &c.—Var. *a*, Nepal et Khasia; var. *β*, paludibus Mont. Khasia; var. *γ*, Sikkim; var. *δ*, Khasia; var. *ε*, Sikkim, Khasia, et Kumaon; var. *ζ*, Khasia; var. *η*, Sikkim; var. *θ*, Sikkim et Khasia (fl. temp. pluv.). (v.v.)

A very variable and common plant, of whose varieties we have had great difficulty in disposing, being at first inclined to divide our extensive series of specimens into six very local species; but when these became the subjects of comparative study along with our own and Cathcart's drawings, and with the suites of specimens from Wallich, Lobb, Strachey and Winterbottom, and especially of Edgeworth, it became at once apparent that to our six we must add as many other local species, not so much because they were distinct, as because they were intermediate in habit and characters (though not in geographical distribution) from our own. Under these circumstances we have thought it best to unite them all.

With regard to the name, we have adopted that applied by Wallich to good specimens in his own Herbarium, though under the same number we find also *I. racemosa*, *I. tingens*, and others. The *I. micranthemum*, Edgew., according to Edgeworth's specimens in Herb. Benth., is hardly different from *I. laxiflorum*, and differs from his description in *Linn. Trans.* in the flowers being fully ¾ inch long, including the spur, and not "minimi." Some of the varieties appear in the dry state to approach very closely some forms of *I. longicornu*, from which it is very difficult to distinguish them. The flowers greatly vary in size, from ½–1 inch long, including the spur, and in colour from a deep golden yellow to

white, or even pale purple, and they are often speckled with rose-colour or purple spots. Edgeworth describes a variety of his *I. micranthemum* as having the spur reduced to a small sac, from which, as well as from the size of the flowers of some of his specimens, I am inclined to suspect that his plant, or some of it, may be referable to *I. brachycentra*, K. & K. The *I. candida*, Lindl., doubtfully referred here by Edgeworth, is certainly a very different plant, having very large flowers, and being undoubtedly a variety of *I. Roylei*. Edgeworth's *I. elata* appears from his specimens to be a form of *I. leptoceras*, but the specimens are not sufficient for satisfactory determination.

This species is on the whole most nearly allied to *I. tingens*, but distinguished by its much larger flowers and longer spur; some specimens are, however, with difficulty distinguishable. There are sometimes pedicellate glands on the basal margins of the leaves.

92. I. LAXIFLORA (*Edgew. in Linn. Trans.* xx. 39). Caule elato erecto, foliis 3–6″ longe petiolatis petiolo alato ovato-lanceolatis utrinque acuminatis grosse crenatis sinubus setigeris, pedunculis numerosis gracilibus subterminalibus, racemis breviusculis, bracteis parvis ovato-subulatis, floribus aureis v. pallide purpureis cum calcare ¾″, sepalis parvis ovato-subulatis, labello infundibuliformi in calcar rectum conicum flore longiore sensim attenuato, vexillo orbiculari concavo non cornuto, alis majusculis purpureis rotundatis v. inferiore longe caudato, capsula angusta lineari.

I. micranthemum? *Edgew. in Linn. Trans.* xx. 39.

Hab. Himalaya temperata, Sikkim, alt. 9000–11,000 ped.! *J. D. H.*; Garwhal et Kumaon! *St. & W.*, *Madden*; Simla, 6000–8000 ped.! *T. T.* (fl. temp. pluv.). (v.v.)

Herba 3-pedalis. *Folia* membranacea, alterna, basi interdum glanduloso-setigera, petiolo basi glandulis magnis non stipulata, sed interdum caulis infra petiolum linea glandularum nigrarum instructa est. *Pedunculi* 3–5″, 6–14-flori. *Pedicelli* graciles, ½″. *Flores* pallide purpurei v. violacei, interdum sordidi? *Capsula* linearis, gracilis, ¾″, oligosperma.

Very similar indeed to *I. leptoceras*, and probably only a form of that plant; but distinguished by its shorter spur and usually lilac lateral petals. Most of my specimens have rounded lobes to the petals, but in one of Strachey and Winterbottom's the lower lobe terminates in a long subulate tail.

93. I. LEMANNI (*H. f. & T.*). Erecta, glabra, caule ramoso, ramis subopposititis, foliis longe petiolatis late ovatis obtusis obtuse dentatis, pedunculis elongatis apice flores 3–5 gerentibus, bracteis parvis late ovatis, floribus majusculis, sepalis late ovato-cordatis, vexillo hemisphærico, labello late infundibuliformi in calcar elongatum gracile incurvum abrupte attenuato, alis amplis.

Hab. Affghanistan solo arenoso prope Otipore! *Griffith*, 1251, *It. Not.* p. 346 (Herb. Lemann, et Bentham).

Species valde distincta, ob folia longe petiolata late ovata obtusa et obtuse sinuato-dentata (ut in *I. noli-tangere*) facile distinguenda. Exemplar solitarium annuum, spithamæum, ramosum. *Petioli* ½–1″, lamina 1″. *Pedunculi* graciles, foliis æquilongi. *Flores* rosei, conferti v. racemosi, pedicellis ½″, cum calcare 1–1½″ longi.—"Calcar fusco-rubrum, alis basin versus albis, limbo aurantiaco-maculatis."—*Griffith.*

This species belongs in habit and foliage to the group with *I. noli-tangere* and *fulva*, and has no very near ally in India.

94. I. GLAUCA (*H. f. & T.*). Elata, tota glauca, foliis longe petiolatis oblongo-cordatis grosse crenatis, pedunculis terminalibus lateralibusque fructiferis robustis elongatis 8–12-floris, pedicellis fructiferis robustis patulis, capsula lineari-clavata acuminata oligosperma.

Hab. Himalaya occidentali temperata; Kumaon ad Dwali, alt. 9500 ped.! *Strachey et Winterbottom.*

Species singularis (sed exemplar mancum) ubique pallide pruinoso-glauca. *Caulis* 3-pedalis, ramosus, crassitie digiti minoris. *Folia* 1–4-pollicaria membranacea, supra pallide viridia. *Pedunculi* fructiferi 6–10″. *Flores* ignoti. *Capsula* 1½″. *Semina* magna.

95. I. TUBERCULATA (*H. f. & T.*). Caule erecto ramoso, foliis 1–2″ breviuscule petiolatis elliptico-ovatis lanceolatisve utrinque acuminatis in petiolum angustatis grosse crenatis dentibus basi glandulosis, pedunculis brevibus terminalibus lateralibusque 4–8-floris, pedicellis brevibus, floribus sordide purpureis, sepalis falcatis, labello conico gibbo non calcarato, capsula brevi clavata verruculosa.

Hab. Himalaya orientali temperata et subalpina, Sikkim, alt. 10,000–13,000 ped.! *J. D. H.* (fl. Aug.–Sept.). (v.v.)

Herba robusta, 2–3-pedalis. *Folia* glandulis dentium versus apices interdum setigeris, nervis tenuibus valde divergentibus; glandulis nullis, v. interdum ad basin foliorum v. petiolo v. caule ad basin petiolo sessilibus v. stipitatis. *Flores* ½–¾″ longi. *Capsula* papillis magnis subseriatis verruculosa, crassiuscula, ½″ longa.

96. I. BRACHYCENTRA (*Kar. & Kir.*). Caule elato ramoso gracili, foliis 3–5″ petiolatis membranaceis elliptico-lanceolatis utrinque acuminatis crenatis serratisve dentibus apice setuligeris, pedunculis numerosis terminalibus gracillimis multifloris, bracteis subulatis, pedicellis gracillimis, floribus pallidis minimis, sepalis parvis oblongo-lanceolatis, labelli sacco conico acuto, capsula lineari glaberrima acuminata oligosperma.

? I. elata, *Edgew. in Linn. Trans.* xx. 41.

Hab. Himalaya occidentali temperata, alt. 5000–9000 ped. a Kunawur! *Jacquemont T. T.*; ad Marri! *Fleming* (fl. Jun.). (v.v.).

Dist. Soongaria.

Herba 2–4-pedalis. *Folia* pallide viridia, nervis divergentibus tenuissimis, basi setoso-glandulosa v. nuda, petiolo interdum basi utrinque glandula cylindrica v. depressa instructa. *Pedunculi* 3–5″, stricti. *Pedicelli* 1″. *Flores* ¼″ longi. *Capsulæ* ¾″. *Semina* 3–6, oblonga, opaca, striata, sub lente lineis crebre rugulosis notata.

Very nearly allied to *I. parviflora*, DC., of Siberia, and perhaps only a short-spurred form of that plant. Edgeworth's specimens of *I. elata* in Herb. Benth. are imperfect, wanting the flower, but in habit, foliage, fruit, &c., they entirely accord with the *I. brachycentra*.

H. Hydroceras, *Blume*.

1. Hydroceras triflora, *W. & A. Prodr.* i. 140.

Impatiens angustifolia, *Blume.*—I. triflora. *L.*—I. natans, *Willd.*

Hab. Ubique in uliginosis, Bengaliæ! utriusque Peninsulæ! Ceyloniæ! et Birmæ! (fl. temp. pluv.). (v.v.)

Dist. Java!

Postscript.—Lieut. R. H. Beddome, in his paper alluded to in the foot-note at p. 112, has described twelve additional Peninsular species from the Anamallay Hills, and given a synoptical table of all the Peninsular species, in which two more species, *I. phœnicea* and *I. Pulneyensis*, are briefly diagnosed. Lieut. Beddome's paper seems to be a very good one, and I have little difficulty in referring all his new species to the sections I have established; they are the following:—

§ A I. verrucosa. *Alæ* bilobæ, verrucosæ. *Calcar* elongatum.
Hab. Mont. Anamallay, alt. 5000–7000 ped.

I. crenata. *Alæ* bilobæ, cum fasciculo pilorum. *Vexillum* crenatum. *Calcar* breve.
Hab. Mont. Anamallay, alt. 5000 ped.

I. Akka. *Flores* magni. *Alæ* bilobæ, cum fasciculo pilorum. *Vexillum* integerrimum. *Calcar* breve.
Hab. Mont. Anamallay, alt. 7000–8000 ped.

I. tenuis. *Flores* parvi. *Alæ* bilobæ, pilosæ. *Vexillum* integerrimum. *Calcar* breve.
Hab. Mont. Anamallay, alt. 5000–7000 ped.

I. gracilis. *Alæ* integræ. *Calcar* elongatum.

§ B I. ligulata. *Alarum* lobus interior ligulatus. *Calcar* absconditum!
Hab. Sylvis, alt. 2000–3000 ped.

§ C I. viscosa. Erecta, ramosa. *Pedunculi* viscidi, 6–12-flores. *Calcar* curvum gibbum. *Semina* echinata.
Hab. Mont. Anamallay, alt. 3000–5000 ped.

I. Anamallayensis. *Folia* opposita, ramorum alterna. *Pedunculi* 6–8-flores. *Calcar* breve, rectum. *Semina* villosa.
Hab. Mont. Anamallay, alt. 5000–7000 ped.

I. Pulneyensis. *Bracteæ* glandula terminatæ. *Calcar* non gibbosum. *Hab.* Mont. Pulney, alt. 8000 ped.

§ D I. parvifolia. *Folia* minuta, cuneata. *Pedunculi* axillares, solitarii, elongati.

Hab. Mont. Akka, alt. 8000 ped. (aff. *I. pendulæ*).

§ E I. parasitica. Omnia ut videtur *I. viridifloræ*, sed alarum lobus superior sub vexillo reconditus.

Hab. Mont. Anamallay, alt. 5000–6000 ped.

I. elegans. Erecta. *Calcar* 0. *Semina* pilosa.

§ F I. Tangachee. *Pedunculi* folia longe superantes, apice 4–8-flores. *Flores* minimi. *Calcar* gracile.

§ G I. Wightiana. Suffruticosa. *Folia* anguste lanceolata. *Pedunculi* solitarii, petiolum paullo excedentes, per totam longitudinem floriferi. *Calcar* breve, incurvum.

Hab. Mont. Anamallay, alt. 4500 ped.

I. phœnicea. *Calcar* apice inflatum.

Hab. Mont. Pulney, alt. 7000 ped.

Lieut. Beddome's paper supplies the following additional habitats and elevations to Peninsular species:—*I. scapiflora* attains 7000–8000 feet; *I. rivalis*, 3000 feet; *I. viscida* and *I. campanulata* ascend to 7000 feet; *I. maculata* grows on the Anamallays at 4500 feet.

I. filiformis is, according to Beddome, distinguished from *I. inconspicua* by the glabrous pedicels, and *I. cordata* from *I. viscida* by the peduncles not being viscid.

On the *Fumaria capreolata* of Britain.

By Charles C. Babington, Esq., M.A., F.R.S., F.L.S.

[Read November 17, 1859.]

It is several years since there was considerable discussion amongst those botanists who take an especial interest in the accurate determination of British plants, concerning a *Fumaria* which grows plentifully in the Channel Islands, Western Cornwall, and near to the coast of Wales. It was then determined by Mr. Mitten (Lond. Journ. of Botany, vii. 556) to be the *F. agraria* (Lag.), and I, confidently believing that that identification was correct, gave a tolerably full description of it (Bot. Gaz. i. 62) under that name. At the same time I referred some Azorean specimens, received from Mr. H. C. Watson, severally to the *F. agraria* (Lag.), *F. muralis* (Sond.), and *F. capreolata* var. *media* of Webb. Concerning this, Mr. Watson remarked that, "to his eyes, after examining scores of the Azorean *Fumarias*, living and dried, they

seem all to belong to one species, and to be so little different, and so gradually dissimilar, as to be scarce worthy of separate names, even in the light of varieties only" (Phytol. iii. 805). As will shortly be seen, I now think that he was nearly, if not quite correct in those remarks. Opinions formed after the examination of only a few very imperfect specimens, and therefore little more than guesses, are never either conclusive or satisfactory. Mr. Watson's own view, which was founded upon scores of specimens examined when alive, is, of course, nearly conclusive against that formerly held by me. Of the three Azorean plants then noticed (Bot. Gaz. *l. c.* 63 & 64), two certainly do seem to belong to one species: the third (sent by Mr. T. C. Hunt from St. Michael's) looks far more like a form of the true *F. capreolata*; it is too incomplete for satisfactory determination. The two first-mentioned specimens I now refer to the *F. muralis* (Sond.) with some confidence; and if Mr. Hunt's broader-leaved plant is correctly joined to them, as was believed by Mr. Watson, we shall have arrived at the same result for the Azores that Mr. Lowe (Fl. Mad. 13) has done for Madeira, namely, that all the so-called *F. capreolata* of those islands is really the *F. muralis* of Sonder.

After reading Mr. Lowe's most valuable remarks (*l. c.*), I was led to re-examine my British specimens, in the hope of finding amongst them the *F. muralis*,—suspecting that my former *F. agraria*, which, in deference to the views of Dr. Walker-Arnott and Mr. Watson, I had ceased to regard as a species, might be rightly so named. Although the result is a little different from that expectation, all my supposed *F. agraria* proving to belong to the *F. confusa* (Jord.), nevertheless I find amongst plants received from Mr. Leighton examples of the *F. muralis*. This is the more interesting from Mr. Jordan's remark, made in the year 1848, concerning *F. muralis*. He said, "specimina hujus in Gallia lecta nondum vidi;" and as it is not noticed in the third edition of Boreau's valuable 'Flora of Central France,' nor in Lloyd's Flora of the West of that country, we may perhaps safely conclude that it has not even now been detected there. I possess an authentic specimen of *F. muralis* from Mr. Sonder himself, and another from the Island of Madeira, by which to determine the plant of Lowe. They accord very satisfactorily with each other and with the descriptions of the species as given by Sonder, Koch, A. Jordan, and Lowe.

These plants, together with *F. capreolata* (*F. speciosa*, Jord.), *F. pallidiflora* (Jord.), and *F. Boræi* (Jord.), combined with a few

others which inhabit the regions bordering on the Mediterranean Sea, constitute the Section *Capreolatæ* of Hammar, in his 'Monographia Generis Fumariarum,' for a copy of which I am indebted to my celebrated friend Fries.

This group of *Fumarias* has long been the subject of discussion amongst botanists, and it still remains difficult to ascertain the characters considered as distinctive by the describers of the species; for the descriptions are scattered through various books, some of which are rarely to be met with, and being drawn up by writers holding different views concerning the value of characters, are often not of easy comparison. As early as the year 1839 Dr. Walker-Arnott (Edinb. Bot. Soc. Rep. iii. 106) described as varieties of *F. capreolata*, under the names of *α. australis*, *β. Reichenbachii*, and *γ. Anglica*, three plants (preferring to consider them "as well-marked varieties to separating them as ill-defined species"), which I believe to be the *F. speciosa*, *F. pallidiflora* (including *F. Borœi*), and *F. muralis* (perhaps including *F. confusa*) respectively. As Dr. Walker-Arnott had not noticed what I consider as the real distinctive characters of these plants, he exercised a sound judgment in calling them only varieties; but I rather wonder that in his editions of the 'British Flora' he does not mention them—even as such. The possession of authentic specimens, received from Mr. Leighton, enables me to identify Dr. Walker-Arnott's plants, and to award to him the credit of being apparently the first botanist to notice them. In 1841 Mr. Leighton (Fl. Shrop. 344) carefully described two forms of the supposed *F. capreolata*, and adds, that that which he distinguishes from the type of the species "merits attention and further remark," which, however, he does not seem ever to have given to it. His supposed type of *F. capreolata* I believe to be the *F. muralis*, Sond., and his second form is the *F. Borœi* (Jord.) and the *F. capreolata β. Leightonii* of my 'Manual.' Mr. Sonder (Koch, Syn. ed. 2. 1017) described his *F. muralis* in 1844; Mr. Jordan his *F. confusa* in 1848 (Cat. Dij. 18), his *F. Borœi* in 1849 (Cat. Gren. 15), his *F. speciosa* in the same year (Cat. Gren. 15), and his *F. pallidiflora* (Schultz, Arch. 305) in 1854.

Before proceeding to define the characters of these plants, care must be taken that the species allied to *F. agraria* (Lag.) are separated from the true *Capreolatæ*. They all have very markedly tubercular-rugose fruit,—a rugosity very different from the slightly rough (dry) fruit of some of our plants. None of them have been found in Britain, the climate of which is too cold for them.

Those of the *Capreolatæ* which it is necessary to consider on this occasion are the following: *F. pallidiflora*, *F. Boræi*, and *F. confusa* of Jordan, and *F. muralis* of Sonder. All of these appear to inhabit Britain, and they are also found in the neighbouring parts of Europe. Their fruit is nearly, although not always, entirely smooth. It is chiefly when the fruit is quite dry that a slight roughness may be occasionally detected; but, as was remarked above, in no case do they acquire the tubercular-rugose coat of the plants grouped as the *Agrariæ*.

Mr. A. Jordan appears to have been the first to point out a most valuable character which distinguishes one of these species, the *F. confusa*, in a remarkable manner, and which is applicable also to the others, although less conspicuously. The base of the fruit is furnished with a fleshy mass by which it is attached to the pedicel. The size and relative proportion of this mass (which may be called the *base*) to the fruit itself, and to the enlarged tip of the pedicel, can only be seen when the fruit is fresh (although it may be restored tolerably completely by softening the specimens in boiling water), and has therefore been overlooked by botanists. In *F. confusa* this *base* is so large as to be very nearly as broad as the broadest part of the fruit, and exceeds in width the slightly enlarged tip of the pedicel. In *F. Boræi* it is very narrow and nearly as long as broad, forming a kind of stalk to the fruit. It is much narrower than the rather remarkably enlarged tip of the pedicel. In *F. pallidiflora* the tip of the pedicel is not much enlarged, and very slightly exceeds in width the base of the fruit, which seems to be rather broader, but at the same time rather shorter and less conspicuous than that of *F. Boræi*. In *F. muralis* the tip of the pedicel is enlarged and is rather thicker than the base of the fruit, which is not nearly so broad nor so conspicuous as that of *F. confusa*. It widens gradually upwards, so as to give to the whole fruit a pyriform shape when fresh,—the line of separation between the true carpel and the "base" being only faintly marked. In *F. confusa* the limits of these parts are clearly defined.

There is a character furnished by the little pits at the top of the fruit (one pit being placed upon each side of the base of the style) which is probably of value. They are not very conspicuous on the fresh fruit, but show themselves obviously after its outer coat has shrunk in drying. In *F. pallidiflora* and *F. Boræi* these pits are small, deep, and nearly round; in *F. confusa* they are broad and shallow; in *F. muralis* they are usually so very shallow as often to be scarcely visible.

The size of the fruit separates *F. muralis* from its allies: it is much smaller and also much rounder. The other species now under consideration have fruits all very nearly equal in size, although differing in form.

There is a curious spur attached to, and apparently forming a continuation backwards of, the agglutinated filaments of the upper cluster of stamens. It is directed backwards into the spur of the upper petal, and may possibly furnish characters by which to assist in distinguishing species. I believe that the credit of first calling attention to it belongs to Parlatore, who describes and figures it in his 'Monografia.' My acquaintance with it is very slight, my attention having only recently been directed to it. If we may judge from books, few botanists appear to know of its existence.

I have failed in detecting any constant characters in the leaves, the forms and sizes of which are very variable. Neither does the erect or rampant or prostrate state of the stem seem to be of much consequence. When writing about *F. confusa* (my *F. agraria*) in the 'Botanical Gazette,' I remarked that the stem was erect in the earlier, and procumbent in the later part of the summer. Such I suspect to be also the case in the other plants now under consideration.

The differences which are found in the forms and proportions of the sepals and of the bracts will be noticed under the several species, as will be also the colour of the corolla and the direction of the fruit-bearing pedicels.

The only British plant which can be confounded with these *Capreolatæ* is the diffuse state of *F. officinalis*. It is perhaps often called *F. capreolata* by careless observers; and its being distributed by them with that name has tended to confuse the ideas of better botanists who have only had the dried specimens before them. Amongst nearly allied and similar-looking plants, it is often better to append no name to a specimen than to risk the application of a wrong one. This rampant form of *F. officinalis* agrees in nearly all respects with the erect and typical form of that species. Its spikes of fruit are very long and lax; its fruits are obovate-retuse, with a very faintly marked base and decidedly rugose surface; its lower petal is spathulate, being linear with the exception of a round dilatation at the end. As far as I am able to ascertain, the spikes of all these *Capreolatæ* are always much shorter; their fruits are never retuse, have always a marked base, and a surface which is not rugose, although sometimes slightly rough when dry; their

lower petal is not spathulate, but widens gradually throughout its upper half.

Dr. Walker-Arnott has shown (Edinb. Bot. Soc. Rep. iii. 99) that the typical *F. capreolata* (Linn.) is the plant found at Montpellier (the *F. speciosa* of Jordan). It is exceedingly beautiful, and has larger flowers than those of *F. pallidiflora*. Its corolla is white, but tinged reddish on the back and with a brownish-black tip. The pedicels are turned downwards, "parallel to the peduncle, almost from their point of insertion, and this before the flowers have fallen off, so that the spur of the flower is superior, the apex pointing downwards," to adopt his accurate words. The fruit is much smaller than that of *F. pallidiflora*, and closely resembles in size and form that of *F. muralis*, except that it is *not* "equally rounded at the top as elsewhere," but is slightly truncate; the apical pits also are small but deep. It seems to be quite a distinct species from either of those described in this paper, and is chiefly found in the South of Europe. Linnæus adopted it primarily from Bauhin, and DeCandolle ascertained that the plant found at Montpellier is that of Bauhin. I have a specimen of the *F. capreolata* (*F. speciosa*, Jord.) gathered at DeCandolle's station by Sonder. Linnæus also quotes Ray's 'Historia' (405) to his plant, and therefore gives England as a locality for it; but Ray's plant is certainly not that of DeCandolle, which is apparently as certainly that of Linnæus, who does not seem to have known it practically, but adopted it from his predecessors.

Some excellent botanists will doubtless say that these plants are all forms of one variable species, and I suppose that no person is in a position to contradict them; for who knows what really constitutes a species amongst plants? It seems to me to be just as impossible to prove that the "aggregate species," as Mr. Watson terms them, are quite distinct from each other, as it is to show that the "segregate species" are so. The difference between my views and those of my eminent friends referred to above amounts only to this, that they think that by a study of the aggregate species they best advance our knowledge of the vegetable creation, whilst I consider a discrimination of the segregate species to tend at least as greatly to that end. The search after truth is our common object, and, although we may be far from having yet attained to it, we all confidently hope that our accurate and honest endeavours will assist our successors in its discovery.

1. F. PALLIDIFLORA (*Jord.*): sepalis ovatis dentatis corollam dimidiam longitudine fere æquantibus ejusque tubum latitudine superan-

tibus, *fructibus* subgloboso-compressis obtusis *longioribus quam latis* lævibus, *basi fructus brevi pedicelli apice angustiore,* bracteis *pedicellos* floriferos excedentibus *fructiferis reflexis* paulo brevioribus, racemis evolutis laxis brevibus paucifloris.

F. pallidiflora, *Jord. in Schultz, Arch.* 305; *Bor. Fl. du Centre de la Fr.* ed. 3. ii. 34.

F. capreolata, *Hamm. Mon. Fum.* 24. t. 3 (excl. var. *a* et *β*).

Sepals soon falling, usually entire towards the point, as broad as or broader than the cor.-tube. Cor. large, cream-coloured, tipped with red or pink; tube thick; lower petal linear, green, boat-shaped, gradually dilated towards the end, its sides inflexed; lateral petals linear, truncate-apiculate, with a narrow keel. Fruit with a short and rather narrow base which is very nearly as broad as the thickened tip of the pedicel; edge not regularly rounded, but the whole vertical outline rather quadrangular; apical pits small and deep. Fruit-stalks usually curved back, but sometimes only patent or divaricate.

The *F. capreolata β. Reichenbachii* of Arnott (Rep. Edinb. Bot. Soc. iii. 106) includes this plant and *F. Boræi*, as I learn from specimens named by Dr. Arnott for Mr. Leighton.

The fruit of my plant is always longer than broad, and its base has little of the stalk-like character of that of its nearest ally, *F. Boræi,* from which also its paler flowers and recurved fruit-stalks seem to distinguish it.

As the typical *F. capreolata* (Linn.) is the *F. speciosa* (Jord.), that name must disappear from our flora.

I have seen specimens of this plant from Salcombe and Ilfracombe, Devon; Watchet, Somerset (Rev. W. W. Newbould); Oystermouth near Swansea, Glamorgan; Caernarvon; Oswestry, Shropshire.

2. F. Boræi (*Jord.*): sepalis late ovatis dentatis tubi corollæ latitudine latioribus eodemque ½ brevioribus, *fructibus* subgloboso-compressis *truncatis latioribus quam longis* demum paulisper rugulosis, *basi fructus angusta pedicellique apicem haud superante,* bracteis sæpe pedicellos floriferos paulo excedentibus *fructiferis patentibus* brevioribus, racemis evolutis laxis brevibus paucifloris.

F. Boræi, *Jord.*! "*Cat. Grenob.* 1849, 15;" *Pugil.* 4. *Lloyd, Fl. Ouest France,* 24. *Bor. Fl. Cent. France,* ed. 3. ii. 34. *Billot, Exsic.* No. 2209.

F. capreolata, *Curt. Fl. Lond.* ii. 145 (fasc. vi. 47); *Koch in Sturm, Deutschl. Fl.* 62. 13.

F. capreolata β. Leightonii, *Bab.*! *Man.* ed. 4. 17.

F. capreolata (second form), *Leight.*! *Fl. Shrop.* 345.

F. media *a. typica*, *Hamm.* 28. t. 3.
F. muralis, *Bor. Fl. Cent. Fr.* ed. 2, not *Sond.*

Sep. soon falling, attached above their base, deeply toothed at the base, often toothed throughout. Cor. rather large, pale, often purplish, with a dark purple tip; pet. gradually narrowed to an acute point at the tip; lower petal often free and either patent or declining. Fruit with a narrow base, which is usually, perhaps always, much narrower than the enlarged tip of the pedicel. The vertical outline is rather quadrangular with the sides rounded and top truncate; apical pits small and deep. Fruit-stalks patent, straight, or rarely slightly deflexed.

This is probably the *F. capreolata* of Smith, under which name Mr. A. Jordan received it from Sir W. J. Hooker (Archiv, 305). It is certainly the *F. capreolata* of Curtis's beautiful plate in the 'Flora Londinensis.' Sowerby's plate in 'English Botany' is probably taken from a specimen of *F. Boræi*, but may contain some traces of *F. muralis*. A minute examination shows that the drawing is not trustworthy.

The specimen from Winandermere, with long bracts, referred to *F. capreolata* in my paper published in the first volume of the Edinburgh Botanic Society's Transactions, is a state of *F. Boræi*.

Lloyd (Fl. Ouest) describes the fruit of his *F. Boræi* as "un peu plus long que large." It seems therefore probable that he may include the *F. pallidiflora* under that name. The fruit of my plant seems to be always rather broader than long, and is remarkable for the squareness of its vertical outline and the stalk-like appearance of its base: approaching in form to that of *F. officinalis*; but it is not so short relatively to its breadth, nor retuse. Its racemes are few-flowered and short, thus differing greatly from the long and many-flowered ones of *F. officinalis*.

F. Boræi is perhaps too nearly allied to *F. pallidiflora*; at least such seems to be the case when dried specimens are examined. Its leaflets appear to be narrower relatively to their breadth. The corolla is always much tinged with pink, which is rarely the case with those of its ally. Its sepals are usually more toothed, and are generally larger. Its fruit is different in shape; the base is broader, but still not so broad as the tip of the pedicel, although that part is less enlarged than in *F. pallidiflora*.

I have seen *F. Boræi* from Tenby, Pembrokeshire; Shrewsbury; Windermere, Lancashire; Glenmore near Lisburn, co. Antrim (Dr. J. H. Davies).

3. F. CONFUSA (*Jord.*): sepalis ovatis apiculatis dentatis tubi corollæ latitudinem æquantibus eodemque ⅔ brevioribus, fructibus subgloboso-compressis apice rotundatis demum paulisper rugulosis, *basi fructus latissima pedicelli apice conspicue latiore*, bracteis pedicellos floriferos æquantibus *fructiferis patentibus* duplo brevioribus, racemis evolutis laxis brevibus paucifloris.

F. confusa, *Jord. Cat. Dij.* 1848, 18; *Lloyd, Fl. Ouest Fr.* 24.

F. Bastardi, *Bor.* "*in Rev. Bot.* ii. 359"; *Fl. Cent. Fr.* ed. 3. ii. 34.

F. agraria, *Mitt.* ! *in Lond. Journ. Bot.* vii. 556; *Bab.* ! *in Bot. Gaz.* i. 62 (not *Lag.*).

F. capreolata, *Bab.* ! *Prim. Fl. Sarn.* 4.

F. capreolata γ. media, *Bab.* ! *Man.* ed. 4. 17.

F. media β. confusa, *Hamm.* 28. t. 3.

Sep. often persistent with the young fruit. Cor. rather large, but less than that of *F. pallidiflora*, dingy white or pinkish; tip and sometimes the back dark purple; tube rather thick; lower petal linear, flattened, blunt, keeled and brownish, and with inflexed sides towards the tip; lateral petals linear, truncate-apiculate, broadly but shortly boat-shaped, winged on the back. Young fruit rather obovate-acuminate. The fleshy base is nearly as broad as the fruit, and wider than the much-enlarged tip of the pedicel: it is scarcely narrower at its base than where it joins the fruit. The vertical edge of the fruit is regularly rounded, and the whole outline, above the enlarged base, is nearly round; apical pits broad but shallow.

If attention be paid to the shape of the fruit, and especially to its remarkable base, there cannot be any difficulty in distinguishing this plant from *F. pallidiflora* and *F. Boræi*; neither does it seem probable that any botanist who examines them when fresh will have doubts about the specific distinctness of this plant from its allies.

Had I possessed the acuteness of observation which belongs to Mr. Jordan, I should not have been misled into reducing this plant to a form of *F. capreolata*, after having recorded it as a species, although with an erroneous name. The effect of my so acting has been what is usual in such cases, viz. that the plant has suffered total neglect in this country. There seems to be no surer mode of diverting attention from a plant than that of placing it as a variety of some species supposed to be well known.

I have seen specimens of this plant from Jersey and Guernsey; Zennor and Trevenna, Cornwall; Ilfracombe, Devon; Tenby, Pembrokeshire; Aberystwith, Cardiganshire; Bangor, Caernarvonshire; Hawkhead, Lancashire; and Dublin.

4. F. MURALIS (*Sond.*): sepalis ovatis acutis basi dentatis tubi corollæ latitudinem subæquantibus eodemque ⅔ brevioribus, fructibus obovato-compressis apice rotundatis parvis sublævibus, *basi fructus lata obconica pedicelli apice paulo angustiore,* bracteis pedicellos floriferos æquantibus *fructiferis erecto-patentibus* brevioribus, racemis evolutis laxis brevibus paucifloris.

F. muralis, *Sond.*! *in Koch, Syn.* ed. 2. 1017; *Fl. Hamb.* 385. *Jord. Cat. Dij.* 1848, 19. *Lowe*! *Fl. Madeira,* 13. *Fries, Summa,* 146; *Fl. Dan.* t. 2473.

F. Petteri, *Koch, Syn.* ed. 2. 435 (not *Reichenb.*).

F. capreolata var. media, *Fries, Mant.* iii. 88.

F. capreolata (type), *Leight.*! *Fl. Shrop.* 344.

F. media γ. muralis, *Hamm.* 29. t. 4.

Plant usually more lax than its allies. Corolla smaller than that of *F. confusa,* tipped "dark atro-purpureous or black." Petals abruptly apiculate. The fleshy base is not nearly so broad as the fruit, and narrows very conspicuously from above downwards to the pedicel, the tip of which slightly exceeds it in width. The fruit, together with its base, has thus, when fresh, an obovate or nearly pyriform outline; it is equally rounded at the top as elsewhere, and neither pointed nor retuse, as is well remarked by Mr. Lowe; the apical pits are usually so very slightly impressed as almost to escape notice. The bracts are often not more than half as long as the fruit-stalks.

Fries seems to include under his *F. muralis* the plant of Sonder and also the *F. confusa* of Jordan; for he states (Mant. iii. 88) that it is the *F. capreolata* of Eng. Bot. (t. 943), and says of it, "Galliæ occidentali, Britanniæ præcipue boreali et Norwegiæ extimis oris propria videtur." The plant of Western France is certainly the *F. confusa.* What the Norwegian plant may be is unknown to me, for I have not seen a specimen; but as it is found "Norwegiæ maxime occidentalis," it may well be the true plant.

This is probably the type of the *F. capreolata* γ. *Anglica* (Arn.), which is considered as the true *F. capreolata* by Leighton. A considerable series of Leighton's specimens is before me, some of which were named (γ. *Anglica*) by Arnott. But, apparently, Arnott included the *F. confusa,* and perhaps *F. Borœi,* in that variety. Leighton seems to have inclined towards the opinion that his two forms of *F. capreolata* were distinct species, as is the fact. To him therefore is due the credit of first discriminating between *F. Borœi* and *F. muralis* in this country, although he refrained from naming the new species, and was unacquainted

with the most valuable characters by which they are distinguished from each other and from their allies.

I have seen *F. muralis* from Barnes, Surrey (Mr. Pamplin); Shrewsbury, Salop; Wrexham, Denbighshire (J. E. Bowman); Sheffield (Rev. W. W. Newbould).

Having now characterized all our species belonging to the group called *Capreolatæ*, it may be well to add a similar notice of the true *F. capreolata* (Linn.), derived from specimens received from several parts of the South of Europe, and especially from some gathered by Mr. Sonder at Montpellier, in the place pointed out by DeCandolle.

F. CAPREOLATA (*Linn.*): sepalis ovatis basi dentatis tubi corollæ latitudine latioribus eodemque duplo brevioribus, *fructibus obovato*-compressis obtusis parvis longioribus quam latis lævibus, basi fructus lata obconica pedicelli apicem æquante, bracteis *pedicellis floriferis et fructiferis reflexis* brevioribus, racemis evolutis laxis brevibus paucifloris.

F. capreolata, *Linn. Sp. Pl.* 985. *DeCand. Syst.* ii. 133; *Fl. Fr.* iv. 639; *Prod.* i. 130.

F. speciosa, *Jord.* "*Cat. Gren.* 1849, 15;" *in Schultz, Arch.* 199; *in Walp. Ann. Bot.* ii. 28. *Lloyd, Fl. Ouest*, 24. *Bor. Fl. Cent.* ii. 34.

Sepals persistent, often even found with the fruit, usually entire in their upper half. Cor. very large, white, tipped with brown-black. Fruit half as large as that of *F. pallidiflora*. Base of the fruit not nearly so broad as the fruit and narrowing downwards to its point of attachment. The whole fresh fruit is rather pyriform, quite smooth; its apical pits conspicuous.

On *Combretum butyrosum*, a new kind of Butter-tree from South-eastern Africa. By T. CARUEL of Florence. Communicated by J. D. HOOKER, M.D., F.R.S. & L.S.

[Read Nov. 17th, 1859.]

SEVERAL years ago Professor Joseph Bertoloni published an account of a kind of vegetable butter, which he had received from South-eastern Africa together with dried specimens of the tree that produced it. This tree Professor Bertoloni considered as belonging to a new genus, which he consequently described under the name of *Sheadendron*, and called the plant *S. butyrosum*, from an idea that it was the same as the celebrated Shea-tree mentioned by Mungo Park. According to him, the *Sheadendron* could

not belong to any of the known orders of plants, but ought probably to constitute a new order of *Sheæ*, in the neighbourhood of *Myrtaceæ*.

Owing to the liberality of the learned Professor, who sent specimens of the plant, both in flower and fruit, to the Central Herbarium in Florence, I have been able to examine it more closely, and the result of my inspection has been to confirm a suspicion that had arisen in my mind, at first sight of the plant, that it was a *Combretacea*. In fact, I consider it as a true *Combretum*, from which it differs in no respect but in having an apterous fruit—a character by no means sufficient, I should think, to constitute it as a distinct genus, much more so as we see in the same order another genus (*Terminalia*) with winged or wingless fruits. The blossoms and the general habit are entirely those of a *Combretum*. The following description of the plant (which I shall call *Combretum butyrosum*) will, I hope, satisfy my readers as to the accuracy of the view I have taken of the subject.

Combretum butyrosum, *Car. MSS.* (*Sheadendron butyrosum*, Bert.! Illustr. di Pianti Mozambicesi, dissert. 1ª, p. 12, f. 4, where the analyses of the flower are partly incorrect, the ovules of the inferior ovary being taken for a free ovary, &c.; Walp. Ann. Bot. Syst. iii. 861).—Arbor. Rami tenues, incurvi, teretes, juniores pube rufa adpressa villosi, dein glabrati cortice tenui griseo facile scindibili. Folia opposita, exstipulata, brevissime petiolata, petiolo villoso, elliptica, integerrima, margine tantulum recurvato, basi subcordata, apice cuspide brevi apiculata, reticulato-nervosa, nervis subtus prominentibus, ½–1 decim. longa, dura, supra lævia glabra, subtus pallidiora glandulisque exiguis crebre punctata. Spicæ (ut videtur indeterminatæ) multifloræ, densæ, breves, pedunculo brevi vel longiusculo stipitatæ, paucæ (ad summum 5) oppositæ vel alternæ in ramulis ex axilla foliorum ortis, quæcunque basi suffulta bractea lanceolata caduca. Flores erecto-patentes, sessiles, bracteola filiformi breviuscula comitati. Calyx obconicus, 8^{mm} longus, tubo brevissimo, cum ovario connato, villoso, limbo glabrescente, glanduloso, fauce parum ampliata, 4-dentata, dentibus brevibus, triangulis, barbatis, præfloratione valvatis. Petala 4, parva ($1\frac{1}{2}^{mm}$ longa), ad summam faucem inserta, cum dentibus calycinis alternantia, cuneata, truncata, apice eroso-dentata. Stamina 8, 4 cum petalis alternantia supra medium limbi calycini inserta, breviter exserta, 4 autem petalis opposita sub ore inserta, longe exserta. Filamenta filiformia, apice subulata, glabra, staminum omnium æquilonga, ante anthesin incurvata. Antheræ parvæ, ovales, medio dorsi insertæ, utrinque emarginatæ, introrsæ, longitudinaliter dehiscentes, deciduæ, in sicco ochroleucæ. Pollen (in aqua) globosum, poris ut videtur tribus donatum. Ovarium inferum, uniloculare,

biovulatum, ovulis ex apice loculi pendulis, anatropis, raphe introrsa. Stylus simplex, filiformis, glaber, longe exsertus, in alabastro vario modo curvatus, stigmate simplici. Fructus fere magnitudinis nucis myristicæ, 1–2 in quoque pedunculo, ovales, acuti, tomentosuli, 4-sulcati, sulcis fundo rugosis, pericarpio ligneo, in valvis 4 partibili. Semen unicum, totum loculum fructus implens, substantia interna meandriformi, in sicco inextricabili.—(v. s. sp.)

Hab. In Africa austro-orientali, et verisimiliter provincia Caffrorum.

According to the information gathered by Professor Bertoloni, the butter produced by this tree is called *Chiquito* by the Caffres, and commonly used to dress their victuals; it is also carried to the coast of Mozambique as an article of commerce. It is white, and rather hard, with a peculiar aromatic odour, which may be traced to the fruit and its kernel from which it is obtained. Its chemical composition is—Olein 25, Margarin 75=100.

I cannot agree with Professor Bertoloni in the opinion that our *Combretum butyrosum* is the same as the Shea-tree of Mungo Park, as such an opinion is grounded on no other fact than that both are from Africa and produce a kind of vegetable butter. The figure given in the first Voyage of Mungo Park of the Shea-tree is of a plant far different from our *Combretum*, with its elliptical-oblong, slightly obovate, obtuse leaves, with rather long foot-stalks, alternate and clustered in close spirals at the top of the branches. The fruit also is different. Nor is there any reason to believe with Professor Bertoloni that the figure was drawn by mistake from some other plant. Mungo Park referred the Shea to the order *Sapotaceæ*, and it seems rightly, as it has been subsequently described by G. Don as a kind of *Bassia* (*B. Parkii*).

Descriptions of New Species of *Utricularia* from South America, with Notes upon the Genera *Polypompholyx* and *Akentra*. By Daniel Oliver, jun., F.L.S. (With a Plate.)

[Read Nov. 17, 1859.]

I furnish, in the first place, a description, with an excellent figure by Mr. Fitch, of a new and remarkable epiphytical *Utricularia* sent recently by Professor Jameson of Quito to Sir William J. Hooker.

Utricularia, *L.* (Sect. *Orchidioides*, A. D.C.)

U. Jamesoniana. Scapo gracili (2–3-pollicari) 1–2-floro, folio basi ejus lineari-lanceolato v. lanceolato-spathulato, corollæ labio

superiore amplo late ovato integro obtusissimo calycis lobum superiorem integrum ovatum obtusum superante, labio inferiore antice 3-lobato lobis obtusis integris v. centrali emarginato, calcari basi saccato-conico ultra porrecto cylindrico apice acutato calycis lobum inferiorem 2–3-plo excedente.

Ad fluvium Cosanga, Prov. Ecuador, legit Prof. Jameson.

U. rhizomate gracili ad truncos arborum repente, ad scapum et folium unicum etiam e nodis fibrillas tenues utriculiferas cum ceterisque paucis incrassatis tuberculatis emittente. *Folia* semper e basi scaporum ut videtur solitaria acuta v. obtusiuscula glabra in petiolum gracillimum attenuata. *Scapus* glaber interdum foliolis v. squamis 1–2 parvis lineari-lanceolatis basifixis instructus. *Bractea* lanceolata v. ovato-lanceolata bracteolis geminatis angustioribus æquilonga, omnes basifixæ et quam pedicellus breviores. *Calyx* lobis fere æqualibus glabris ovatis v. vix subcordatis, obtusissimis v. lobo inferiore leviter emarginato. *Corolla* purpurea (Jameson, *in lit.*) labio superiore pro planta magno verosimiliter nonnunquam apice abrupte obtuso, labio inferiore calcari breviore: calcar apicem versus pilis sparse obsitum. *Ovarium* tempore florifero in stylo crasso brevi sed fere æquilongo continuum. Capsulam maturam haud vidi.

Folia 6–10 lin. longa, 1–1½ lin. lata. Bractea 3–3½ lin. longa. A basi calycis ad extremum calcaris 6–8 lin. (Tab. I. fig. 1. Planta magnitudine naturali. *a, a.* flores integri; *b,* pistillum; *c,* folia; *d,* ampullæ sub lente auctæ, et *e,* eædem nascentes.)

Much smaller and more slender than *Utricularia unifolia*, Ruiz and Pavon, and *U. montana*, Jacq.*; differing also essentially in the spur, which exceeds the calyx, the three-lobed lip of the corolla, and other characters.

In enumerating the species of *Utricularia* collected by Richard Spruce, I desire to acknowledge the valuable aid afforded to me by the careful notes upon the plants in the fresh state, which, in accordance with the practice of that excellent botanist, accompany the specimens sent home by him. Comparatively few of them have been collected in sufficient quantity to supply the whole of his subscribers; and of some the specimens have been too much injured, or are otherwise insufficient, for accurate determination. Had the sections of the genus adopted by Benjamin, in his Monograph of the Brazilian species in the 'Flora' of Von Martius, recommended themselves to me as of practical use to botanists, I should probably have arranged these plants in accordance with them: some of these sections, based upon the presence or absence of ampullæ and of leaves at the time of flowering, are calculated to mislead.

* I am not aware that a specific difference exists between these plants.

No. 194. *Utricularia pallens*, St. Hilaire. Para coll.

No. 444. „ „ „ Santarem.

No. 1071. *U. Parkeriana*?, A. DC. Santarem. This plant is allied to the foregoing, but differs in its longer, cylindrico-subulate, adpressed, obtuse spur which exceeds the lower lip of the corolla. The specimens are scarcely in a condition to be determined without doubt.

No. 310. Santarem.
No. 963. South shore of Amazon. } *U. foliosa*, L.
No. 1611. Manaquiry.

Seeds about 20–24, flattened, peltate, girt with an obtusely polygonal, narrow, submembranaceous wing. I take *U. oligosperma*, St. Hil., to be the same species, as also the *U. vulgaris* figured in Flor. Flum. (tab. 44), and quoted by St. Hilaire and Girard (Monog. Prim. et Lent. p. 21) as representing their plant. Are not these forms of our *U. vulgaris*, L.?

No. 1053. *U. quinqueradiata* (Spruce's MSS.). Santarem.—I regard this as a small form of the *U. inflata*, Walt., of the North American continent. Specimens from Florida (Rugel, coll.), labelled *U. inflata*, var. *minor*, do not seem different.

No. 1041[2]. An *U. purpureæ*, Walt., varietas? *U. myriocista*?, St. Hil. Santarem.—Corollæ albæ (margine purpurascente) labium superius rotundatum integrum, l. inferius amplum trilobatum lobis obtusissimis, calcar conico-cylindricum obtusum quam labium parum brevius. *U. palatina*, Web. MSS. (in Hb. Hook. vidi) ad eandem accedit.

No. 1044. Santarem, and

No. 2986. San Carlos. *U. longeciliata*, A. DC. (Prodr. viii. p. 23). *Polypompholyx laciniata*, Benjamin (in Linnæa, xx. pp. 316, 496, and Flor. Bras. *Utriculariæ*, p. 251).

Collected also by Gardner, Hostmann, and others in Brazil and Guiana. Benjamin errs in referring this plant to the Australian genus *Polypompholyx*, established by Lehmann (Nov. stirp. Pugill. viii. p. 48), the *Tetralobus* of A. DeCandolle (Prodr. viii. p. 667). The calyx of *Utricularia* is constantly diphyllous. In the true *Polypompholyx*, in addition to the anterior and posterior calycine segments, common also to *Utricularia*, we find a pair of opposite, lateral, and somewhat smaller lobes within the former. Minute lateral bracteoles with the usual subtending bract, as in numerous species of the allied genus, are also found at the base of the pedicel. It is upon the quadripartite calyx alone that the genus depends; in other respects it is, I believe, quite a *Utricularia*.

In *U. longeciliata* the lateral bracteoles, which are rather largely

developed, are not, as is usual, attached immediately by the bract, but spring from the very short pedicel at a small yet clearly marked interval beneath the true calyx-segments, towards which they are, of course, laterally disposed. Benjamin has erroneously regarded these bracteoles as forming part of the calyx, and indeed figures them as such in the 'Flora Brasiliensis.' It is undoubtedly a true *Utricularia*. A. DeCandolle, in describing the plant (Prodr. viii. 23), expressly states, ". . . bracteolis 2 majoribus flori adpressis;" and in the description of *U. fimbriata*, H. B. K. (Nov. Gen. et Sp. ii. 225), which I think the same species, we also find a correct view has been taken of these appendages:—"Pedunculi basi instructi bracteola ovata dentato-ciliata adpressa. Bracteæ duæ sub quoque flore, oppositæ, ovatæ, dentato-ciliatæ," &c. If an examination of the specimens of Humboldt and Bonpland confirm this presumed identity, their name must necessarily take precedence.

No. 1042. *Utricularia viscosa* (Spruce). Scapo (2–4-unciali) 2–6-floro viscoso, squamis parvis basi-solutis, calycis lobis subæqualibus rotundatis, corollæ albæ labio superiore rotundato integro lobo calycis fere duplo majore, calcari conico-cylindrico obtusissimo deinde curvato-porrecto corollæ labium inferius galeatum indivisum parum excedente, pedicellis fructiferis erectis, capsula globosa calycem superante. Santarem, floret mens. viii.

Folia non vidi. *Scapus* (fide Sched. Spr.) valde glutinosus, squamis ovato- v. lanceolato-rhomboideis utrinque plus minus acutis v. obtusiusculis. *Pedicellus* infimus adscendens 4–6 lineas longus. *Corolla* alba, labio superiore lineis purpureis notato, palato flavescente. *Semina* minuta, numerosa, rotundata v. elliptica, areolato-reticulata. Ab filamentorum insertione ad apicem calcaris circiter 2 lineas.

No. 2569. *U. peltata* (Spr.). Foliis orbiculatis peltatis, scapo hirtiusculo (2–4 unciali) 2–4–5 floro, squamis minutissimis basifixis, pedicellis calycem æquantibus, calycis lobis æqualibus ovatis, corollæ labio superiore obovato-oblongo integro calycem superante, calcari porrecto conico-cylindrico obtusiusculo corollæ labio inferiore integro rotundato fere duplo longiore. Prope Panurè. Floret mense ix. (Tab. I. fig. 2. Planta mag. nat. *a, a.* Flores a facie latereque visi; *b, b.* folia peltata; *c,* radicis fibrilla utriculifera; *d,* ampulla magnitudine aucta.)

Folia per florescentiam persistentia numerosa, margine integra v. leviter crenulata, diametro 1–3 lin., petiolis gracilibus cum fibrillis paucis utriculiferis interdum instructis. *Bracteæ* basifixæ ovatæ v. lanceolatæ bracteolis lanceolatis æquilongæ. *Calyx* hirtiusculus, lobo superiore acuto, inferiore minute emarginato. *Corolla* purpureo-cærulescens palatum versus albescit, labio superiore infra angustato, inferiore basin calcaris amplectente. *Stylus* brevis sed primum ova-

rium fere æquans. A basi calycis ad extremum corollæ calcaris circa 3 lineas.

A remarkable little plant, forming patches one to two feet in diameter in a sandy islet in the Falls of Panurè. Sufficiently distinct in its peltate orbicular leaves from all the smaller species with which I am acquainted.

No. 1050. *U. Spruceana* (Benth.). Scapo $1\frac{1}{2}$–3 unciali unifloro, pedicello e bractea marginibus ejus in vaginam parvulam infundibuliformem connatis, calycis lobis rotundatis integris, corollæ labio superiore oblongo emarginato v. retuso calycem fere duplo superante, labio inferiore antice leviter retuso v. subintegro, calcari crasso obtuso dependente v. paululo curvato labium corollæ inferius æquante v. parum excedente. Santarem.

Scapus gracilis esquamatus basi fibrillis radiciformibus utriculiferis, foliis in spec. nostris ut videtur tempore florifero desunt, bractea involucriformi basi in scapo continua margine supra leviter bilobata. *Calyx* lobis fere æqualibus obtusissimis, inferiore quam calcar 2–3-plo breviore. *Corolla* alba, fauce macula flava notata. *Stylus* primum ovarium fere æquans. A basi calycis ad extremum calcaris corollæ $1\frac{1}{2}$–2 lin.

The singular, minute, sheath-like involucre may perhaps result from confluent bract and bracteolæ. Spruce sent it over under the MS. name of *U. uniflora*; this, however, was preoccupied by a plant of Robert Brown's.

No. 2858. *U. trichophylla* (Spr.). Scapo (5–12 unc.) pauci–multifloro, foliis capillaceo-gracillimis inter scapos erectis sursum pinnatifidis segmentis utrinque paucis angustissime linearibus simplicibus v. dichotomis, bracteis mediofixis, pedicellis remotis brevibus erectis, corollæ labio superiore integro elliptico v. ovato obtusissimo, calcari porrecto conico-cylindrico apicem versus oblique acutato labium corollæ inferius integrum subæquante v. vix excedente. Ad flumen Uaupès.

Radix fibrillis utriculiferis instructa. *Folia* 4–5 uncialia. *Bracteæ* basi obtusæ apice acutæ v. obtusiusculæ. *Pedicelli* breves calycem æquantes v. vix duplo excedentes. *Calyx* lobis subæquantibus obtusissimis altero emarginato. *Corolla* flava, calcari circiter 3 lin. longo.

Spruce describes the remarkable and extremely slender leaves of this plant as growing erect amongst the scapes.

No. 3011. *U. neottioides* (A. St. Hilaire), β. *pedicellata*. Scapo 1–$1\frac{1}{4}$ unciali 2–4-floro interdum bifido, pedicellis capsulam 2–4-plo excedentibus.

In rupibus humectatis Monte Cocui, San Carlos. Flor. mens. vii.

Although differing much from *U. neottioides* in habit, I do not discover technical characters sufficiently marked to warrant its

publication as a new species. In *U. neottioides* we find often many-flowered racemes, pedicels short, almost adpressed to the scape, "flowers subsecund, subnutant,"—altogether very suggestive of its specific name. In Spruce's plant the few flowers are not racemose, but with ascending or divergent pedicels 2–3 lines in length. Benjamin, in his Monograph of the Brazilian Utriculariæ, places this species under his section '*Ampullæ destitutæ. Folia divisa.*' Although I have not myself actually seen in the typical plant either leaves or bladders, yet I think he is here in error. In the present variety both occur, the leaves being entire. St. Hilaire and Girard, in a paper, previously quoted, on South Brazilian Lentibularieæ, &c. (p. 31), state, in describing their species—"Folia basi capillacea superius parum dilatata et divisa," &c., but follow with—"an potius primum integra, sed, parenchymate aquis mox destructo, nervi superstites?" I append a further description of the pedicellate form, which may be compared with the plant of St. Hilaire by those botanists who possess good specimens of it. It is not improbable but they may be correctly considered as distinct species.

Radix fibrillis utriculiferis instructa, utriculis gibboso-urceolatis prope basin lateraliter brevi-pedicellatis. *Scapus* erectus. *Folia* parva lineari-lanceolata integra obtusa, in petiolum gracillimum angustata. *Squamæ* scapi 2–3 ovatæ basi-solutæ utrinque obtusæ. *Calyx* lobis fere æquilongis, inferiore autem valde angustiore ovato obtuso, majore abrupte v. late rotundato-cuneato. *Corolla* albo-virescens, labio superiore concavo ovato-rotundato integro calycem plus quam duplo superante, labio inferiore profunde trilobo, lobis lineari-oblongis obtusis æqualibus, calcari saccato scrotiformi brevissimo obtuso.—Pedicelli fructiferi erecti. Capsula late elliptica v. obovata obtusissima, stylo subnullo.

No. 3238. *U. angustifolia*, Bj. (Linnæa, xx. pp. 311, 320). Flores flavo-virides. Esmeralda. Flor. m. xii.

No. 3735? Ad eandem valde proxima, differt corollæ colore purpurascente. Secus flum. Atabapo.

The specimens of this plant are imperfect.

No. 3241. Esmeralda, in campis humidis, xii. 1853.
Scapus 6 uncialis, foliis $\frac{1}{4}$–$\frac{1}{2}$ unc. longis obovato-spathulatis. *Flores* cærulei, fauce lutea.

A single specimen with but one flower remaining. It corresponds very well with the description of *U. bicolor*, St. Hil.; the form of the leaves, however, of that species is undescribed.

No. 2967. "Locis arenosis fl. Negro inundatis." San Carlos.

I refer this plant, though with some hesitation, to *U. cornuta*, Mx., of which I take it to be a small variety. In the same species may probably be merged *U. colorata*, Bj., and *U. appressa*, St. Hil. Style, at flowering, about equalling the ovary. Pedicels slender, erecto-patent, not shorter than the calyx. Spruce describes the leaves as ligulate, retuse, 1-nerved, with a few sacs underneath. Flowers yellow, with a red arc on the palate.

No. 1256. Barra?

No. 2257. San Gabriel.

No. 3644. Flum. Maypures.

These approach *U. subulata*, L., very closely. I cannot distinguish them from that species. *U. nervosa*, G. Web. MS. in Hb. Berol. (Benj. Monog. Utric. Bras. p. 247), seems to me doubtfully distinct from the same, and to this form probably Spruce's plants may be referred.

No. 3037. San Carlos. In bad condition; perhaps the same with the foregoing.

No. 924. Santarem. Likewise imperfect: apparently of the same difficult group with the last four numbers.

In the 'Linnæa,' vol. xx. p. 319, Benjamin describes, under the name of *Akentra*, a supposed new genus of *Lentibularieæ*, founded upon a plant of Hostmann's (Surinam Coll. No. 85), to but insufficient examples of which he had access. He appends to his description the following honest observation, which, however, can scarcely be said to establish the propriety of publishing the genus under such circumstances:—"Der Mangel des Sporns (weshalb ich den Namen *Akentra* (κέντρον, calcar) wählte) schien mir an mehreren Exemplaren, die ich sah, deutlich zu sein, doch waren die Blüthen durch das Trocknen so unkenntlich geworden, dass ich nicht ganz sicher bin, ob nicht vielleicht, was ich als Unterlippe beschrieb, der Sporn sei; künftige bessere Exemplare werden das entscheiden und vielleicht eine Aenderung des Namens nöthig machen." An examination of the specimens in the Kew Herbarium, collected by Hostmann, confirms the supposition here expressed, that the remarkably large, saccate, oblongo-cylindrical, and abruptly obtuse spur has been mistaken for the lower lip of the corolla, and that the plant is a true *Utricularia*. From the extreme delicacy of the corolla, I have not

completed its examination, especially that of its upper lip; but as ample characters are elsewhere furnished for its specific identification, at least in relation to those already described, we may refer it to the proper genus under the name of *U. Benjaminiana.* It resembles *U. inflata* in size and the presence of a floating verticil of abortive foliaceous axes on the lower part of the scape.

U. Benjaminiana. *Axis* demersus; foliis capillari-divisis sparse utriculiferis. *Scapus* infra verticillum natantem pilosus supra glaber esquamosus 4–7 pollicaris, vesicis 6–10 lin. longis lineari-lanceolatis utrinque angustatis apicem versus segmentis capillaceis instructis, 6–multiflorus. *Bracteæ* basifixæ. *Pedicelli* calycem parvum æquantes v. duplo excedentes. *Calcar* denique 4–5 lin. longum, labio inferiore corollæ duplo longius, apice abrupte obtusum emarginatum. *Capsula* minute apiculata, seminibus circiter 5 complanatis ala membranacea anguste circumcinctis. *Akentra inflata,* Bj. Linnæa, xx. 319.

Note.—I may add to the above the correction of some misprints, &c., affecting the sense, which I observe in my paper on Indian *Utriculariæ*, published in the 'Linnean Journal' (Bot. Proc. vol. iii. p. 170). For "*aciculiferis*" and "*aciculifera*" (pp. 174, 175), read "*utriculiferis,*" &c.; "Bracteis basi-*volutis,*" read in all cases "*solutis*;" "*volute*" also, in foot-note, p. 174, should be "*solute.*" In the description of *U. Wallichiana*, p. 182, line 7 from bottom, for "2–3-plo *longiore*" read "*breviore.*"

Notes of a Visit to the Cinchona Forests on the western slope of the Quitenian Andes. By Richard Spruce, Esq. Communicated by Sir W. J. Hooker, F.R.S., F.L.S.

[Read Dec. 15, 1859.]

My last letter informed you that I was contemplating an expedition to the forests producing the Cinchona Tree on the western slopes of the Quitenian Andes. I was for some time doubtful as to what part I should visit—it was but two or three days' journey to the forests of Jilimbi and Guanujo at the western foot of Chimborazo, but to reach them the Paramo de Puenevata (the northern shoulder of Chimborazo) has to be passed near the snow-limit, and in the months of July and August it snows there almost incessantly, while the winds blow with a violence unparalleled even in this windy region, frequently hurling away both horse and rider, who are either seen no more, or their mangled remains are found

at the foot of some precipice. Besides, only one sort of Cinchona was known to exist in those forests, whereas by going a few days' journey farther to the southward, to the forests below Alausi, in the valley of the river Chanchán, I might expect to find three sorts, and the road thither nowhere ascends above 12,000 feet. So the latter plan was finally adopted, and on the 22nd of July I sallied forth from the pleasant town of Ambato (8500 feet) along the narrow "callejon" (lane) which separates the eastern from the western branch of the Cordillera. My company comprised five horses and mules, one mounted by myself, another by my servant, and the remaining three laden with my baggage, consisting of drying-paper, clothing and bedding, and a copious supply of tea, coffee, and sugar—articles rarely to be met with in a country where there are no inns, and where the inhabitants with few exceptions use no other beverage than aquardiente and sour chicha. An arriero took charge of the beasts of burden.

Our first day's stage to Riobamba was a long one, 12½ Columbian leagues (about 40 English miles). The first five leagues, reaching to the village of Mocha, are along a very gradual ascent, varied by a few shallow quebradas. The soil is what in Yorkshire we used to call "a leight blaw-away sand," which, when the sun and wind are up, scorches and blinds the traveller, though it produces scanty crops of maize, barley, peas and lupines (eaten here under the name of "chocchos"). The indigenous vegetation is limited to a few insignificant weeds, chiefly Composites, nestling under the hedges of *Yucca* and *Agave*. The flowers of the two latter plants—so great a rarity in England—are here to be seen all the year round, and their tall tree-like peduncles are the poles used throughout the Cordillera for all common purposes, such as fences, rafters, and even walls of houses, &c. Long files of asses laden with them enter the towns of Ambato and Riobamba every market-day.

Beyond Mocha we leave the sandy country, and after passing two streams which descend from Mount Carguairazo, on our right, we begin to ascend to the Paramo de Sanancajas, the grassy meseta which extends along the eastern base of Chimborazo, at a height of from 11,000 to 12,000 feet. Near its commencement the road leading from Quito to Guayaquil branches off to the right, while that to Riobamba and Cuenca continues straight on. The weather had been rainy for many previous days, and we had had drizzling rain all the way to Mocha, so that we were not without apprehension of suffering from the cold on the paramo. Fortunately, just

as we reached it, the sun shone forth, the clouds cleared away, and the glaciers of Chimborazo stood out against the blue sky like cut marble; but the ground was still so sloppy that what I had formerly passed over in two hours now took me three. What is called the "road" consists of I know not how many deep ruts, crossing and anastomosing in a very bewildering way, and so muddy and slippery that my horse preferred stumbling along among the hassocks of *paja blanca* (white grass)—a species of *Stipa* with feather-like silvery panicles tinged with rose—which forms the mass of the vegetation on the paramo. This grass affords excellent thatch; it is also extensively used in packing, and along all the higher grounds it is almost the only material for fuel. Between the hassocks, especially where there are slight declivities, there is an interesting sub-alpine vegetation,—a dense grassy turf is enamelled with flowers, white, yellow, red, and purple, which seem to spring direct from the ground. Three daisy-like *Werneriæ*, all stemless and solitary, of which *W. nubigena* with its large white stars is the most conspicuous, grow along with a stemless *Valeriana*, a small *Castilleja*, a *Lupinus*, a *Cerastium*, two species of *Gentiana* and two of *Azorella*. The cæspitose *Werneriæ* are true alpines, and grow at 2000 feet above the species just referred to. There are many little lakes, frequently bordered by the swelling, glaucous, sphagnum-like tufts of a *Plantago*, over which creep the silvery threads of a minute *Gnaphalium* and an equally minute white-flowered *Gentiana*. In such situations grow also a small *Ranunculus*, bearing generally a single sessile flower and a pedunculate head of follicles, a *Stachys*, and several other herbs of humble growth. Heath-like tufts of *Hedyotis ericoides*, often accompanied by a suffruticose *Valeriana* of similar habit, and sometimes by a *Calceolaria*, here and there diversify the landscape; while the hassocks shelter in their bosom purple *Lycopodia* and other plants.

Having passed Sanancajas, we descend to the sandy plain of Riobamba, whose general character is the same as that of Ambato, save that cactus-hedges often replace those of aloes.

In Riobamba I remained three days with my hospitable countryman Dr. James Taylor, and then proceeded on my way, going the first day only as far as Miraflores, a farm six leagues away from Riobamba, and near the village of Guamóte. On the way we had to climb over a small space of paramo, where we got the benefit of a storm of hail and sleet. The vegetation was scanty, and I gathered only a minute Umbellifer which was new to me. Miraflores is what is called a cold farm, consisting chiefly of pasture

and barley fields. A short ascent from it brought us upon the Paramo de Tiocajas, which is full six leagues across. Anything more desolate than this paramo I have nowhere seen. It is one great desert of moveable sand, in which the distant patches of *Cacti*, *Hedyotis*, and a succulent *Composita*, only render its nakedness more apparent. Where there is a little moisture, solitary plants of a silky-leaved *Plantago* struggle for existence. The altitude is about the same as that of Sanancajas, and it may be imagined how cheerless was a slow ride of nearly twenty miles over such a waste, rendered all the more gloomy by a leaden sky overhead, and a piercing wind which came laden with mist and fine sand. I was obliged to go nearly at the pace of my loaded beasts, the unsettled state of the country, and the number of deserters from the "constitutional" army roaming about, rendering it unsafe to leave my goods a moment. Yet even such an "Ager Syrticus" has its points of interest, for on this place is seen the dividing of the waters of the Atlantic and Pacific oceans. We passed many small streams, some rising on the paramo, and some in the western Cordillera, but all running eastward to join the Great River, with whose waters and forests I was long so familiar; when, however, we approached the southern side of the paramo, we came on the Rio de Pumacháca (River of the Bridge of Tigers), a considerable stream rising in the eastern Cordillera and running westward towards the Pacific; it is in fact one of the sources of the river Yaguáchi, which enters the gulf of Guayaquil. From the Pumacháca northward, until very near Quito, all the streams of the central plain between the two branches of the Cordillera flow eastward, and unite in the gorge of Baños to form the river Pastusa, which speedily reaches the Amazonian plain, and thence the Atlantic; but the streams around Quito itself unite to form the river of Esmeraldas, and seek the Pacific. Near the Pumacháca there was rather more vegetation; patches of *Cyperaceæ* were dotted with the white flowers of a minute *Lobelia*, which I have seen in many similar situations, and groups of *Cactus* were draped over by an *Atropa*, remarkable for its aromatic leaves. It is singular that in so deadly a genus all the species I have seen in the Quitenian Andes have edible though very acid fruit, and that the shoots are cropped by asses and llamas.

As we descended from the southern side of the paramo, the *Hedyotis* began to be mixed with a small labiate shrub of very similar foliage, and bearing numerous spikes of lilac or violet flowers; and farther down the latter grew so abundantly that it

covered the whole hill-side with a mass of aromatic flowers, which was an agreeable change from the sterile paramo. The road ran parallel to the Pumacháca, but at a vast height above it. It was well on in the afternoon when we reached the village of Ticsán, still in the cool region, and, as we calculated on finding more comfortable quarters in Alausí, which was two leagues ahead, we resolved to try to reach it, which we accomplished just after nightfall, having in the day made ten leagues. With some trouble we succeeded in getting a little food for ourselves; but food for our beasts was of more importance, and we could get none. At four o'clock the following morning I roused my people and sent them out to the neighbouring farms in quest of *alfalfa* (lucerne). They returned bringing a mule-load, which, though an insufficient quantity, was better than none, and we delayed our journey until eight o'clock, in order that the poor animals might eat, for we had this day only five leagues before us.

Our road now turned to the right, while that to Cuenca continues southward and crosses the elevated ridge of Azuáy. We still followed the course of the Pumacháca, which gradually turns westward, and bursts through the Cordillera in a gorge so deep and narrow, that with difficulty has a narrow path been cut along the declivity on the southern side. The whole five leagues from Alausí to Chúnchi consists of steep ascents and descents, and of perilous crossings of precipitous slopes, not to be passed without a shudder; for the track is in many places so narrow that two persons mounted could not pass each other without endangering the life of one of them. Fortunately our beasts were sure-footed and the road was dry; in fact, from Ticsán, where we fairly began to descend the western slope of the Cordillera, we found we had got into the height of summer, having left mid-winter behind us at Ambato and Riobamba. The hill-sides were well covered with grass, but all completely withered up by nearly two months of dry weather; so that except near the streams, where there was a margin of scrub or low forest, the eye rested on nothing green.

Alausí stands at about the same height as Ambato, but is subject to still more violent winds, so that even the crops of maize are rarely to be seen standing erect. As a town, it bears no comparison with Ambato either for size or neatness, and, like all the other pueblos of the canton (of which it is the *chef-lieu*), seems to have been for several years in a state of decadence: the houses begin to fall and are merely propped up, not repaired or rebuilt; and yet there are all around valuable farms of wheat and maize.

Throughout the Quitenian Andes a bit of solid rock is rarely seen, save where black, jagged masses of trachyte stand out in the higher peaks, which are all either active or dormant volcanos; and on a superficial view most of the hills seem to be made up of *débris*, either, as around Ambato, of calcined and triturated granite and schists, or, as in descending from Alausí, of stones and rude blocks confusedly heaped together. But in one place we saw above us a low cliff of vertical strata, much cracked and bent, as if by some force applied to their ends. The brown hill-sides began to be diversified by an arborescent *Cactus*, with polygonal stems and white dahlia-like flowers, which, Briareus-like, threw wide into the air its hundred rude arms. Lower down, at about 6000 feet, I saw specimens full 30 feet high and 18 inches in diameter. Along with it grew frequently a *Cæsalpinia* and a *Tecoma*, both of which are abundantly planted near Ambato and Guano, the former for the sake of its bark, used in tanning, and the latter because it bears a profusion of ornamental yellow flowers, and is supposed to possess wonderful medicinal virtues.

About two leagues below Alausí the road descends to the margin of the river, where it meets the Chanchán, a larger stream coming from the eastern Cordillera, near the volcano Sangáy; the two united take the name of the latter, and preserve it until issuing into the plain, where, joined by the Chimbo from Chimborazo, they form the river Yaguáchi, which empties itself into the gulf just above the city of Guayaquil. Crossing the Chanchán by a rude bridge near its junction with the Pumacháca, we entered on a beach clad with a grove of Acacias—low spreading trees with very odoriferous yellow flowers and binate spines sometimes three inches long. Near this place, which was still some 8000 feet above the sea, we came on the first sugar-cane farm. The road again leaves the river, and we had finally to climb a long cuesta to reach the village of Chúnchi, which is full 1500 feet above the river.

Chúnchi is the last village on the slope of the Cordillera, and I had calculated on making it my head-quarters, though the forest is still a day's journey farther down. I brought recommendations from Ambato, and the people seemed willing to assist me; but the houses were so miserable, so full of dirt and vermin, and so utterly destitute of furniture (for I could procure neither bedstead, chair, nor table), that I saw I should work on my plants with infinitely less comfort than I used to do in a palm-hut in the warm forest. Another and greater difficulty was the procuring of food for my beasts, for all the pastures were dried up, and a man

who sold me alfalfa for two days then told me he could spare no more. About a league from Chúnchi and 1000 feet lower down, there is a cane-farm called Guataxí, whose owner, Señor José Leon, I had known in Riobamba. Almost in despair, I rode down to consult with him, and he at once invited me to take up my quarters in the hacienda, where he has a good house, with neatly papered rooms and decent furniture. The cane-grounds extend along the banks of a stream, which before falling into the Chanchán forms a considerable lake, on whose shores there was still a little herbage; besides that a few squares near the house were planted with alfalfa.

On the third day after establishing myself at Guataxí, having procured a guide, I proceeded to Lucmas, a short day's journey lower down the river, where there are a few small chacras tenanted by Indians and zambos. There I was told I should be near the *Cascarilla roja*, and I was recommended to a person called Bermeo, who had worked a good deal at getting out cascarilla and sarsaparilla. I at once secured his services, and, as he turned out an honest active fellow, I took him with me in all my subsequent excursions in the district. From him I learnt that the *Cascarilla roja* did not commence until another day's journey downwards, and that to have a chance of seeing it in any quantity (which, he admitted was, at best, only problematical), it would be necessary to penetrate at least three days into the forest. As my object for the present was merely to make myself acquainted with the plant, and with the soil and climate in which it grows, I decided on going no farther than until I should meet with it; for the procuring and transporting of provisions, necessary for a long stay in the forest, is both difficult and expensive.

I remained a day at Lucmas to look around. It is at an altitude of between 5000 and 6000 feet, and produces luxuriant sugar-cane. The small banana called "Guinéo" flourishes (as indeed it does at Guataxí), but the plantain is near its upper limit, and the fruit is small and scanty. There are tolerably lofty forest trees in the valleys and on the hills, while the steep sides of the latter are often covered with grass, more or less intermingled with scrub, and often with Bromeliaceæ. In descending towards Lucmas, I saw on the bushy hill-sides a great deal of the small tree called "Palo del Rosario," a curious, and I believe undescribed *Sapindacea*, which I had already gathered at Baños in the eastern Cordillera. Its most remarkable feature is, that while the layer of wood next the bark is quite white, all the internal layers are purple-brown

with a black outer edge—a colour not unlike that of old walnuts; so that articles fabricated of this wood are curiously mottled. Unfortunately the trunk never exceeds a few inches in diameter, so that only small articles can be made of it. I have secured a specimen of the wood, and of spoons made from it, for the Kew Museum.

One of the most frequent trees at Lucmas, and the most valuable for its hard wood (though the young branches are brittle), is an *Escalloniacea*, called "Ignia." It grows to a good size; the leaves are narrow-lanceolate and very long—the lower ones always red, and the reddish flowers are borne in long pendulous racemes; so that the tree has a very pretty aspect. It abounds along the western slope of the Cordillera, and grows at from 5000 to 9000 feet. It is accompanied by an Amyrideous tree, called "Alubilla," which the people hold in great dread, as they believe that to touch it or pass beneath its shade is enough to cause the body to swell all over. I had already, at Baños, gathered flowers and fruit of it, and stained my hands with the milk, to the great horror of those who saw me, but without experiencing any ill effects; and I believe that the swelling attributed to it is owing more to sudden changes of temperature, or to alternate scorchings and wettings, for I have seen such an effect follow where there was no Alubilla. Be this as it may, the young man I took as guide felt one of his eyes begin to swell the day we left Lucmas for Guataxí, and in a few hours he was swollen from head to foot. In two or three days he was quite well again, but there are cases of the swelling lasting a month. As might be supposed, the blame was laid on the Alubilla.

Lucmas takes its name from the abundance of a species of *Lucuma*, producing an edible fruit; that name is applied to many species of *Lucuma* and *Achras*, all natives of warm or hot countries. Another evidence of the approach to a hot climate was in the existence of a species of *Echites*, twining among the bushes, and in an epiphytal *Marcgraviacea*, quite similar in its long scarlet spikes to *Norantea guianensis*, though the bracts are small patellæ, not elongated sacs, as in that species. A very odoriferous *Citrosma*, with large thin leaves, three together, is known by the name of "Guayúsa," and is often taken in infusion, like the Guayúsa of Canelos, which, however, is a species of *Ilex*.

There were a good many herbs, of species not seen elsewhere. One *Composita*, with virgate stems 12 feet high, large alternate, lobed leaves, and from each axil a small leafy ramulus bearing at its apex a corymb of white radiate flowers, was very ornamental.

Orchideæ were tolerably abundant, but prettier even than these were two *Bromeliaceæ*; the one seemed at first sight merely a mass of long scarlet flowers growing out of the moss on old trees and stones, for the leaf-sheaths are imbricated into a little bulb, and the blade is reduced to a spine; the other (apparently an *Æchmea*) has broadish soft leaves and large violet flowers looking at a distance more like those of an *Iris* or an *Amaryllidea.*

On the 4th of August my company started for the forest, our destination being the Rio de Puma-cocha, a large stream rising in Azuay and falling into the Chanchán at about 4000 feet altitude, on the farther side of which much Red Bark has been got in former years. We started on horseback, and a mule carried our necessaries. My counsel was, to leave the horses, but Bermeo felt sure I should not be able to perform the distance on foot; we had gone, however, a very short way when we found it necessary to cut our way through the forest, for the track had got overgrown in two years that no one had passed along it; nor was it possible without wasting a good deal of time to open a passage overhead so that a man might pass mounted; I therefore preferred going on foot most of the way. We reached the banks of the Puma-cocha at an early hour of the afternoon, but the ford which Bermeo had passed in former years had been destroyed by the falling of a cliff, and in its place we found a deep whirlpool; so with the drift-wood along the banks we set to work to make a bridge where the river was narrowed between two rocks, and when completed carried across it our baggage, saddles, &c. Then, after a long search, we found a place where we could swim the horses over, and by rolling down a good deal of earth and stones we made a way for them to ascend on the other side. Once across, we selected a site for our hut among vegetable-ivory palms, and thatched the hut with fronds of the same. Close by were the remains of a platanal, showing that the spot had formerly been inhabited, and fortunately still bearing a sufficient number of plantains to cook along with our salt meat, during the two days we calculated on remaining there. Our horses were taken to the top of a neighbouring hill, where there was a bed of one of those large succulent Panicums called "Gamalote," which afford a very nutritious food for cattle, and were there made fast for the night. Here we slept tranquilly, save that we were occasionally aroused by the snuffing of bears around us; and before daylight Bermeo and his companion were on foot, and making their way through the forest in quest of Cinchona-trees. They returned at seven o'clock,

having found only a single tree standing, and from that one the bark had been stripped near the root, so that it was dead and leafless. We breakfasted, and then I accompanied them into the forest. We followed the track they had already opened, and then plunged deeper in, meeting every few minutes with prostrate naked trunks of the Cinchona, but with none standing. Bermeo several times climbed trees on the hill-sides, whence he could look over a large expanse of forest, but could nowhere get sight of the large red leaves of the Cinchona. At length we began to tire, and we decided on returning towards our hut, making a detour along a declivity which we had not yet explored. We went on still a long time with the same fortune, and were beginning to despair of seeing a living plant, when we came on a prostrate tree, from the root of which a slender shoot, 20 feet high, was growing. My satisfaction may well be conceived, and my first thought was to verify a report that had been made to me by every one who had collected Cascarilla, namely, that the trees had milky juice, which to me was strange and incredible in the *Rubiaceæ*. Bermeo made a slit in the bark with the point of his cutlass, and I at once saw what was the real fact. The juice is actually colourless, but the instant it is exposed to the air it turns white, and in a few minutes red. The more rapidly this change is effected, and the deeper is the ultimate tinge assumed, the more precious is the bark presumed to be. It is rare to find shoots springing from an old root, because the roots themselves are generally stripped of their bark, which, along with the bark from the lower part of the trunk, is known by the name of "Cascarilla costrona" (from *costra,* a scab), and is of more value than that from any other part of the tree.

The *Cascarilla roja* seems to grow best on stony declivities, where there is, however, a good depth of humus, and at an altitude of from 3000 to 5000 feet above the sea. The temperature is very much that of a summer-day in London, though towards evening each day cold mists blow down the valley from Azuay; and for five months in the year—from January to May—there is almost unceasing rain.

If the *Cascarilla roja* has been almost extirpated at Puma-cocha, there is still left abundance of *Sarsaparilla,* and of a very productive kind, for Bermeo assured me he had once taken 75 lbs. weight of the roots from a single plant; whereas in Brazil the greatest yield I have heard quoted was a little over 30 lbs. The Puma-cocha species has a round stem and few prickles, while that

most esteemed on the Rio Negro has a triangular stem thickly beset with prickles.

Let me now say a word about the other plants accompanying the *Cascarilla,* and first of the Ivory-palm, which is known throughout the Ecuador by the name of "Cádi." In Maynas two species of *Phytelephas* were tolerably abundant, the one a slender species called "Yarina," and the other much stouter, called "Polo-ponto."* Both were usually stemless, though ancient specimens had a short inclined stem. Neither of them seems to coincide with the *Phytelephas* described by Seemann. But the Cádi seems distinct from all the preceding: it has a stout erect trunk of 15 or 20 feet; the fronds are 30 feet long, and *the pinnæ are fastigiate by threes or fours* (as in several *Bactrides* and *Astrocarya*), while in the other species they are equidistant; lastly, *the male flowers are racemed on a long pendulous spadix.* The nuts are much the same as in the other species, only rather larger; they are extensively used in the Sierra for making heads of dolls, saints, and walking-sticks. The Cádi produces a very excellent "cabbage," but the Indian and other inhabitants are fonder of a large maggot, called "Majón," which is bred in its trunk. I have seen the Indians of the Rio Negro and of Canelos roast and eat the larva of a beetle extracted from the trunk of the Popunha palm (*Guilielma speciosa*).

A species of *Carludovica* with pinnate aculeate fronds was also frequent. *Triplaris surinamensis,* with its large bunches of triquetrous red fruits, was quite as abundant as on the Amazon; and *Lasionema roseum,* a tree closely allied to the *Cinchona,* grew side by side with the *Triplaris* at Puma-cocha, just as it used to do at Tarapoto.

In general the arborescent vegetation seemed scanty in species and uninteresting. One of the most striking trees was an *Erythrina* with a slender tortuous (almost twining) trunk, from which sprang long spikes of scarlet flowers, and few branches bearing each a coma of ternate leaves, whereof the leaflets were sometimes 18 inches across. There were also a few figs, and on the steep declivities there were patches of low forest, consisting chiefly of *Clusiæ, Thibaudiæ* and *Melastomaceæ.* Two small *Trichomanes* crept along the branches of shrubs, but terrestrial ferns were all but absent.

On returning that evening to our hut, I consulted with Bermeo about our ulterior movements. He told me that if I would go

* Most likely "Púlu-púntu" is the original Quichua, as the letter "o" does not exist in that language.

another day's journey into the forest, he could with certainty show me more trees of the *Cascarilla roja*, which he had seen not many months previously, and, as on account of the revolution no one had this year entered the forests to collect Cascarilla, it was probable they were still untouched. But for this our stock of provisions would scarcely suffice, and I saw no probability of adding anything interesting to the general collection; besides, I had to visit other forests in quest of other sorts of Cascarilla, and I saw the season was already passing for the flowers and seeds of most trees. We therefore on the following day retraced our steps up the valley, and after another day spent at Lucmas in drying my paper and adding what I could to my collection, I returned to Guataxí.

I was unable to move far from the farm for above a fortnight afterwards, on account of the passage of the Government troops from Quito to Cuenca; for their general, to avoid the cold and stormy Azuay, had decided on passing by Guataxí, whence by a rough track through the woods one may come out at Cañar in two or three days. The owner of Guataxí had taken a prominent part in a late rising against the Government—the insurgents had been defeated in a pitched battle on the flanks of Chimborazo, and now the victorious party threatened terrible things—so he judged it expedient to keep out of the way, and to hide all his horses and cattle in the hills. When the troops actually reached Chunchi, I went thither and had an interview with their chief, from whom I exacted a promise (which was faithfully kept) that nothing on the farm should be molested. You would be nowise interested with anything I could tell you of political squabbles here, which, were it not for the occasional bloody episodes and the wholesale robberies under the name of "contribuciones voluntarias," would seem more like children's quarrels than anything else.

During this interval I was obliged to content myself with the flora of Guataxí. The cane-farm is about 7000 feet above the sea; the maximum temperature each day was generally about 73°, though it once reached 77°, and the minimum temperature varied from 55° to 60°. A plateau, about a thousand feet higher, belongs to the farm, and produces good crops of grain and potatos. The hills adjacent to the farm, except where under cultivation and artificially irrigated, are covered with grass, amongst which the withered remains of a good many annuals were visible. Almost the only annual still flourishing was, singularly enough, a species of *Monnina*, with violet flowers; and, as most of the species of

this genus are trees, I took it for a *Polygala* until I saw the fruit. The "Yerba Taylor" (*Herpestes chamædryoides*, H.B.K.), which has great fame as a remedy for snake-bites, was frequent, but mostly scorched up. Amongst the perennial herbs (most of which were new to me) may be mentioned an *Epilobium*, a *Stachys*, a *Phaseolus*, a *Desmodium*, two *Crotalariæ*, a shaggy *Hieracium*, a very pretty *Leria* with large blue flowers, growing on shady banks, and a branched *Composita* with silky-white leaves and handsome purple flowers, besides several *Solaneæ*, *Labiatæ*, *Ehretiaceæ*, and two *Acanthaceæ*, which last order seems entirely absent from the cold region; also a suffruticose *Lantana* with yellow flowers, which I had not seen elsewhere. In moist places a little *Cuphea* was very abundant. The shrubberies consisted chiefly of *Compositæ*, whereof one resembled a *Spiræa* in aspect and in the odour of its numerous small white flowers; but there was also a new *Büttneria*, and the common *Clematis* of the warmer parts of the Cordillera climbed about everywhere.

In cultivated ground, especially in the maize and cane fields, two delicate broad-leaved *Paspala*, called "Achín," spring up in great abundance. Every day I saw the servants of the farm get bundles of them for the cows, pigs, &c., which ate them with greater avidity than even the alfalfa, so that, though weeds, they were nearly as valuable to the owner as the crops amongst which they grew.

Among the trees, which grew chiefly along the banks of the river, were two species of *Lycium* not previously seen, an *Inga*, a *Mimosa*, and a *Bignoniacea* with broad opposite leaves and cymes of large purple flowers. The last, known by the name of "Hualla," is frequent in the western Cordillera at from 6000 to 9000 feet, and is one of the best timber-trees. It is not improbably the little-known *Delostoma integrifolium*, Don; but it is not a *Delostoma*, for, besides an essential difference in the calyx, the septum is contrary to the valves, as in *Tecoma*, not parallel to them, as in *Delostoma* and *Bignonia*.

So soon as the last soldier had passed, I put in execution my project of visiting the forests producing the *Cascarilla serrana* or Hill Bark, which is found at 8500–9000 feet on both sides of the river Chanchán. I went first to the forest of Llalla, at the foot of Azuay, and only a little more than two hours' journey from Guataxí. Here there is a cattle-farm and a few Indian chacras, in one of which I established myself. I found a rather interesting vegetation, and this consoled me for my wretched quarters in a hut

dark and smoky, and so low that I could not stand erect. We had happened on a windy time, and as the walls and roof were full of chinks, the violent wind which got up at midnight starved us beneath all our blankets and ponchos. After sunrise there was a brief lull, and then it came on again to blow from the same quarter (west, with a slight touch of northing) and so continued through the day. We had no rain during the five days of our stay, although the storms on the farther side of Azuay often overlap as far as Llalla, so that from Guataxi we could see it raining in this hill-forest, when not a drop fell in the lower grounds; and even when it does not rain the forest is generally enveloped in mist. This constant supply of moisture renders the vegetation more vigorous than in the dry grounds below, and is the cause why the trees are so thickly clad with mosses that it is difficult to push one's way through them. Two mosses, whose long slender stems hang down like a beard from the branches, bore here abundance of fruit, which for two years I had sought in vain in other localities. But I was most pleased to find a moss with large laciniato-ciliate leaves—so novel a feature in this tribe, that I took it for a *Plagiochila*, until I found the capsules nestling amongst the terminal leaves.

To return however to our Cascarillas, of which there are two sorts in Llalla, the one called "Cúchi-cára," or Pig-skin, because dried pieces of the bark resemble morsels of pig's-skin boiled and then grilled (which is a favourite dish in Ecuador). The same bark is sometimes called "Cháucha," a term implying thickness without much consistence; as, for example, in this bark, which shrinks much in drying, and in a sort of large watery potato, called "Chauchas." The other bark is called "Pata de gallinazo," or Turkey-buzzard's foot; it does not peel off freely like the other, and when dried generally occurs in small split fragments, but as it is rather deeper-coloured it is more esteemed than the *Cuchicara*. The same, or similar kinds, are known in other districts as "Cascarilla naranjada." The demand for either kind has of late years been very slight, so that there has not been such destruction of these barks as of the red, and on a stony hill-side not far from the hut I found above twenty large trees of the *Cuchicara*, from 40 to 50 feet high. All had fruited freely this year, but the capsules were already empty, with the exception of one small corymb. In the forest of Yalancáy, on the opposite side of the river and near the road leading from Alausi to Guayaquil, I afterwards found a tree with recent fruit and even a few flowers. The latter are

deep brick-red, and the capsules are usually elongate-oblong, but vary to roundish-oblong. Trees of the *Pata de gallinazo* were scarce, and I did not see any in flower or fruit. Both sorts have the leaves broadly oval, with or without a slight apiculus, and pubescent beneath; but in the *Cuchicara* the petiole and midrib are red, which is not the case with those of the *Pata de gallinazo*, nor do the leaves of the latter turn so red with age. The *Cuchicara* has but few virgate branches, while the other has a denser ramification. The leaves of the *Cascarilla roja* are of almost the same form as in the other two—perhaps slightly narrower—and I confess that if I had been shown the leaves only of all three, I should without hesitation have referred them to the same species. I hope the flowers and fruit may afford clear distinguishing characters. The bark of the *C. roja* is a deep purple-brown when good; that of the other two species a pale cinnamon-colour. It is customary to scrape off the external asperities and lichens in the latter, when the surface remains of a pale or whitish colour, but this is never done with the *Roja*. The *Cascarilla roja* is well known to abound in both quinine and cinchonine, and is considered far more efficacious in the cure of intermittent fevers than the other two, which however are sometimes used in preference when it is desired to avoid the astringent effects of the *C. roja*.

Of the trees growing along with the Cascarillas in Llalla the "Motilón" was the most frequent and the largest, attaining sometimes 60 feet high. This is the second species I have gathered under this name: the fruit is an edible drupe, but I hesitate to refer the genus to *Amygdaleæ* until I see the flower. With the Motilon grew, however, a true *Cerasus*, with very large leaves; it had flowers and young fruit. Other trees in the same forest were the *Hualla*, the *Ignia*, a *Berberis*, a *Rhamnus*, a *Nonatelia*, two *Myrtaceæ*, and especially an arborescent *Loranthus*, with dense spikes of fragrant yellow flowers,—the leaves on some ramuli alternate, on others opposite, and on others three together. I had previously gathered it on Tunguragua. There was also a Solaneous tree, allied to *Lycium*, but with dull yellow bignonioid flowers growing from the naked branches, and in its whole habit reminding me much of *Crescentia*. The shrubs included a *Barnadesia*, two *Salviæ*, a sarmentose *Fuchsia*, and most abundant and ornamental an aphyllous *Fuchsia*, epiphytal and (after the manner of a *Cornidia*) climbing high up the trees, which it adorned with its large vermilion flowers.

Patches of verdant pasture were scattered in the forests, and in

these I gathered a stoloniferous *Ranunculus* new to me, a small *Juncus*, a curious *Rubiacea* allied to *Richardsonia*, two *Ionidia*, the one with red the other with scarlet flowers, and some other herbs. In the woods there was also a stinging herb with large white flowers of the N. O. *Loaseæ*.

The *Orchideæ* must not be forgotten—they were very numerous and in fine state, especially two large-flowered *Odontoglossa*, whose liana-like peduncles depended almost to the ground. There were also some *Oncidia* and *Epidendra*, and many curious things whose affinities I did not recognize, and which I have not yet examined.

From Llalla I despatched my men to the adjacent paramos on that side of Azuay, with instructions to bring me everything they found in flower. They returned bringing a good many alpines, including some pretty *Senecios* not elsewhere seen, a red-flowered cæspitose *Werneria*, a small *Crucifera*, an *Alstrœmeria*, a *Gnaphalium*, but especially a beautiful *Gentiana*, allied to *G. cernua*, and instead of having only one or two pendulous flowers, as in that species, bearing a profusion of erect pyriform red flowers. It is called "Rocotilla" by the inhabitants, from the similarity of its flower to the fruit of a species of *Capsicum* called "Rocote," which is cultivated throughout the cold region.

I have only a few more words to say about the Cascarillas. I have conversed with many people who have worked on the *C. roja*, and all profess to know of places where large trees were left standing last year. As no one has entered into the trade in this present year, those trees may have borne a crop of seeds, from which by next year a number of young plants will have sprung up. They offer also to take me to places where there are beds of young plants of two or three years' growth. In the forests about the foot of Chimborazo I am told that those who cut down bark-trees break off the young branches and stick them into the ground, where most of them take root—a very laudable practice if the effect be such as is stated. It would appear from this that cuttings might be safely tried. I planted two sprigs of the *C. roja* in Bermeo's garden at Lucmas, which were growing when I last heard of them. From what I have this year seen, it appears that the Cinchonas flower at the end of the rainy season —that is in May—and have ripe seeds in July, like a great many other trees. May is the earliest month in which the forest could be entered, and even then not without difficulty and risk. I have made out that the town of Milagro, from which Guayaquil can be reached in a day by navigating the river Yaguachi, would be a

convenient dépôt for the seeds and young plants got out in the forests of Pumacocha, which are three days' journey above. The road is, however, so narrow and bad that there would be small chance of getting live plants down to Milagro in boxes or baskets, either on mules' or men's backs, and I see no other way than putting each plant into a bamboo, where it would travel in perfect safety.

In a farm called Piñancay, adjoining Guataxi, I became acquainted with the owner, Dr. Najera, a very intelligent man, and formerly deputy to the Congress. He has a cattle-farm on the eastern side of Azuay, at the head of the river Jubál; and in a day's journey down that river a forest is reached in a temperate clime, where a great deal of excellent bark has been collected, esteemed nearly equal to the *Cascarilla roja.* This bark is known as "Cascarilla acanelada," and Dr. Najera describes the tree as having a small shining leaf, like that of the orange. In this month or the next the rainy season will be over on the eastern side of Azuay, and if I receive my orders in time, I propose going thither with Dr. Najera in January, when it will be midsummer there, and the *Cascarilla acanelada* should be ripening its seeds. I fear there is no chance of getting young plants alive to the coast, across the ridge of Azuay, 15,000 feet and more in height.

Ambato, Republic of Ecuador,
Oct. 20, 1859.

Notice of the Discovery of *Lastrea remota* in England. By Thomas Moore, Esq., F.L.S., F.H.S.

[Read Dec. 15th, 1859.]

In the course of the past summer, Mr. F. Clowes of Windermere sent me a frond of a fern found by him in the Westmoreland lake district, doubtfully labelled *Lastrea Filix-mas*, v. *incisa*; and he observed that for some years it had been considered to belong to *Lastrea spinulosa.* A specimen subsequently sent, when in a more fully developed state, led to a comparison with the *Aspidium remotum,* A. Br., for a frond of which I am indebted to Professor Mettenius of Leipsig, and this comparison proved the German and Westmoreland plants to be of the same kind.

This *Aspidium remotum* had been first noticed by Braun* as a variety of *Aspidium rigidum,* but it was subsequently regarded by

* A. Br. in Döll. Rhein. Fl. 16.

him as a distinct species, and was described under the name of *Aspidium remotum* *. It has subsequently been adopted as a species by Kunze †, by Fée ‡, by Mettenius §, and by Koch ||. Braun's plant, as far as I am aware, has hitherto only been recorded as a native of Southern Germany, to which must now be added the English habitat of Windermere, Westmoreland.

In general character and aspect the plant very much resembles the vigorous examples of *Lastrea spinulosa* which are sometimes met with, having like that fern narrow elongate erect fronds; but its structure agrees more closely with that of *L. Filix-mas*, than which, however, it is once more divided. It has neither the appearance nor the structure of *L. rigida*. The plant appears to me to have very reasonable claim to specific rank, though on this point it is in these days hopeless to expect unanimity of opinion.

I append the specific character and synonymy of this addition to the British flora, together with a full description of the Westmoreland plant.

Lastrea remota: fronds oblong-lanceolate, subtripinnate, smooth; pinnæ acuminate, distant below; pinnules distinct, pyramidal or ovate-oblong, acute, shortly petiolate below, sessile, with a narrow attachment, or more or less adnate upwards, the basal ones pinnatifid almost to the costa; lobes oblong, blunt, serrated, the serratures acute mucronulate; sori copious over the whole frond, biserial near the costa; indusium reniform, obscurely eroso-dentate, persistent, without glands; stipes and rachis stout, scaly.

Lastrea remota, *Moore, Index Filicum,* 102.

Aspidium remotum, *A. Braun, Verjung.* 330; *Kze. Linn.* xxiii. 230; *Fée, Gen. Fil.* 291; *Metten. Fil. Hort. Bot. Lips.* 93; *id. Aspid.* 57.

Aspidium rigidum, *β.* remotum, *A. Braun, Döll. Rhein. Fl.* 16.

Polystichum remotum, *Koch, Syn. 2 ed.* 979.

Hab. Windermere, Westmoreland (*F. Clowes,* 1859).

Caudex......... *Stipes* a foot long, stout, clothed with numerous scales of various size, some ovate-acuminate, ¾ of an inch long, others smaller, lanceolate or linear, terminating in a lengthened hair-like point, the margins slightly wavy or toothed; along with these larger ones occur numerous others, which are minute, ovate caudate, and peltately attached. *Rachides*, both primary and secondary, furnished with scales, which become smaller upwards. *Fronds* (including stipes) 3–4 feet high, erect, narrow, oblong-lanceolate, smooth, subtripinnate. *Lower pinnæ* 3–4 inches long, ovate acuminate; central ones 6 inches long, linear-oblong acuminate, all ascending, opposite or subopposite, and

* Braun, Verjung. 330.

† Kze. Linn. xxiii. 230.

‡ Fée, Gen. Fil. 291.

§ Mett. Fil. Hort. Lips. 93; id. Aspid. 57.

|| Koch, Syn. 979.

distant below. *Pinnules* (basal ones of second pair of pinnæ) 1¼ inch long, shortly stalked, pyramidal or pyramidal-ovate, acute, pinnatifidly divided nearly to the costa, almost pinnate; lobes oblong, obtuse, about ⅜ inch long, the lowest ones sublobate at their base, otherwise toothed or serrated; the serratures most numerous and prominent at the apex, acute and mucronulate. The pinnules become gradually less pyramidal or ovate, and more oblong, at length linear-oblong as they recede from the main rachis; below, except in the case of the lowest, they are also sessile with a narrowed attachment, but become gradually more and more adnate upwards. The pinnules of the upper pinnæ resemble the smaller pinnules of the lower ones. *Venation* in the larger lobes, consisting of a flexuous primary vein or costule, from which alternate veins proceed towards the serratures of the margin, sometimes becoming branched; the sori are situated medially on the simple veins, and close above the fork on the branched ones. In the smaller pinnules the costule bears a sorus medially on its lowest anterior vein, so that a row of sori are formed on each side of and near to the costa; the basal lobes often bear in addition two or three more sori, and are traversed by a series of alternate simple veins. *Fructification* occupying the whole back of the frond from the base to the apex. *Sori* prominent, distinct, biserial near the costa of the pinnules, and in the larger ones biserial on the lobes. *Indusium* persistent, reniform, obscurely eroso-dentate on the margin, not glandular.

Notes upon the British Herbarium of the Linnean Society. By DANIEL OLIVER, jun., Esq., F.L.S.

[Read Dec. 15th, 1859.]

IT has occurred to me that, from the interest felt in British Botany by many members of the Linnean Society, it might not be amiss to present, in the form of a little notice, in the 'Journal of Proceedings,' a short account of the Herbarium devoted to our own Flora, upon which, at the request of the Herbarium Committee of the Council, I have been engaged, at intervals, within the past two years.

That the formation of such an Herbarium was contemplated, and had indeed considerably progressed, may be gathered from the allusion to it in a late Anniversary Address of our President*, and from its cursory mention in the published 'Minutes of Proceedings.' It has not hitherto, however, been thought needful or desirable to appeal to Fellows for assistance in the contribution of

* Journal of Proceedings, vol. iii. p. xx., 1858.

desiderata, chiefly because it was, in the first place, to be ascertained how far the extensive collections already in the possession of the Society might furnish suites of specimens sufficiently ample for the complete illustration of the various species, and, further, from the probability that a great portion of such desiderata as might remain, especially among the more critical groups, as the *Rubi*, *Salices*, &c., would be supplied to us by Fellows of the Society who have devoted their special attention to the study of such groups, and whose labels bear a high authenticity.

I shall briefly state the extent to which we have, to this time, been able to carry out the design of rendering this collection a thoroughly standard one, and as complete as possible in respect to representatives, not only of each recognized British species, but of each marked form or variety. I ought here to say, that from the very limited accommodation which the Society can afford to this Herbarium, it was early apparent that it would be out of the question to attempt to make it illustrate, in anything like completeness, the geographical distribution of the respective species through our islands; yet in the selection of the required specimens those have been laid in by preference which at the same time indicated by their labels a different locality or extension of area.

The collections which have been accumulating in the Society's rooms over many years have furnished the important nucleus of the present Herbarium; these have been successively gone over, and such examples selected from them as seemed suited to the object in view. Of these collections by far the most important, and affording the great proportion of select specimens, was that bequeathed to the Society by the late N. J. Winch of Newcastle-on-Tyne, an excellent local botanist, and author of one of the best of the older Floras—that of the counties of Northumberland and Durham, published in the 'Transactions of the Natural History Society of Newcastle.'

From a condition in his bequest we are not permitted to remove his specimens from the paper upon which they are mounted, nor to glue down upon the same sheet additional examples; hence between these and the papers now in use, uniform in size but superior in quality, a difference is sufficiently obvious*. From time to time, however, these specimens, which at present form perhaps the major part of our collection, may be removed, if thought desirable, on the substitution of other and yet better examples.

* Contributions to the British Herbarium, to which conditions are annexed limiting the Council in their absolute disposal, cannot in future be accepted.

As might be expected, Winch's Herbarium was rich in North of England plants; of these, his fasciculi of Roses and Willows were particularly extensive: it contained also many rare species from other quarters, received from his correspondents or collected by himself on his longer excursions. A second collection in the Society's keeping was that of the late Dr. Withering, author of the 'Botanical Arrangement of British Plants,' presented to the Society by Beriah Botfield, Esq., F.L.S., grandson of the Doctor. In this Herbarium, deserving of especial attention, was a series of specimens, many of them of infrequent or rare species, collected by the late Robert Brown, near the close of last century, in Scotland and Northern Ireland. These are peculiarly interesting from the valuable notes which accompany them, in Mr. Brown's handwriting. They bear most striking testimony to the early development of his well-known habits of close, sagacious observation and minute accuracy. These were mostly gathered from the year 1791 to 1794, from about the eighteenth to the twenty-first years of his age.

From these herbaria, and also from minor collections formed by Woodward, Relhan, Maton, Dickson, and Don, with packets contributed from time to time by various collectors, a considerable selection of specimens has been made, and amongst them are several which, from their increasing rarity or actual disappearance from within our borders, or from other circumstances, are more particularly noteworthy. Of such we find *Sonchus palustris*, L. (Kent, Cambridge), *Senecio paludosus*, L. (Lakenheath), *Frankenia pulverulenta*, L. (Sussex), *Caucalis latifolia*, L. (Newmarket), *Cypripedium calceolus*, L. (Castle Eden Dene, and Helk's Wood, Ingleboro'), *Carex Davalliana*, Sm. (near Bath), *Eriophorum alpinum*, L. (Restennet, near Forfar, R. Brown), *Elymus geniculatus*, Curt. (near Greenwich, Dickson), *Potentilla tridentata*, Sol. ("East Rocks, Loch Brandy," Don), *Epimedium alpinum*, L. (Hb. Withering, marked "Mr. Robson, from Skiddaw," &c., and Carrock Fell, Cumberland, 1787), *Orchis hircina*, Scop. (Dartford), and *Anthemis anglica*, Sm. (Sunderland, Robson*).

Besides the collections above enumerated, which were examined in the course of last year, we have received recently from Mr. Salter the liberal present of the herbarium formed by his brother, the late Dr. T. B. Salter of Ryde: in addition to an admirable collection of British *Rubi*, very valuable in connexion with his

* I note these as I find them, not forgetful of the observations upon some of them in 'Cybele Britannica.'

Monograph published in the 'Botanical Gazette' (vol. ii. pp. 113, 147), numerous specimens have been laid in from it belonging to other families; and thus in the case of species likewise occurring in the northern counties, obtained from the Winch collection, we have been assisted a little step in the illustration of their geographical extension. Mr. Babington has also presented a large and important parcel, consisting chiefly of rare species, with many of the critical plants which so much occupy the attention of British botanists*. Especially for this addition to the collection, and also for the time and care which Mr. Babington has devoted to going through the Society's Herbarium in order to check the nomenclature, not a little of its value is due.

A few large and difficult genera yet remain to be worked up with reference to our present knowledge; these will probably be undertaken by competent botanists before long. The *Rubi* Mr. Babington has consented to label in accordance with the names to be adopted in his forthcoming Monograph of the British species.

With regard to the mode of arrangement adopted, the paper employed for mounting upon measures about 14½ by 9½ ins., too small, perhaps, but necessarily uniform with that of the Smithian Herbarium contained in the adjoining cabinet. The sheets are marked for ready reference near the right-hand bottom corner, with the number of the species in the 'London Catalogue of British Plants,' which we have made use of as a convenient index to the collection. The mounted specimens are placed in folded sheets of tinted card-board "genus-covers;" these are also numbered consecutively, corresponding to a second numbering (of the genera) in the bound and interleaved copy of the 'Catalogue' kept on one of the lower shelves. The covers slide into fixed partitions measuring about 6 inches in depth, over which the doors of the beautifully constructed cabinet closely shut. The marks suggested by Jos. Woods in his 'Tourist's Flora' are made use of to indicate in the 'Catalogue' the more or less perfect state of the specimens representing each species respectively. Care has been taken to have all the plants poisoned before being laid away.

It may not be out of place to add that, with a view to the further completion of the Society's great Indian Herbarium, the valuable collection formed in Java and Sumatra by the late

* A second packet, since received from the same gentleman, contains a nearly complete set of his "*Rubi*."

Dr. Horsfield, and recently presented to the Linnean Society by the East India Company, has been, within the past few weeks, poisoned, mounted, and arranged.

The species already described by Messrs. Bennett and Brown in the 'Plantæ Javanicæ Rariores,' and also to a considerable extent those of Professor Miquel in the 'Flora Indiæ Batavæ,' have been written up with their respective references. A number of the specimens have been labelled by Miquel himself. The collection is, at present, placed in a cabinet immediately adjoining that containing the Wallichian Herbarium, to which it may be regarded as supplementary.

On the *Rosa rubella* of Winch. By John Hogg, Esq., F.R.S., F.L.S.

[Read Dec. 1st, 1859.]

About the summer of 1823, I discovered in a hedge on the south of the lane leading from Carlton to Norton, in the county of Durham, a rose which had so much of the general appearance of *Rosa spinosissima* that I then considered it to be a *variety* of that species,—only that it had *pink* flowers; I therefore named it, in my short 'Catalogue of Plants' which was published a few years afterwards in Brewster's 'History of Stockton,' as "*Rosa spinosissima*, var. flore *rubro*." Many plants of that species were also growing near the same spot. Some years afterwards, at the request of Mr. Winch, I again made search for that rose, and after a lapse of some two or three years I rediscovered the plant in blossom, having *pink* flowers; I sent a specimen to Mr. Winch, and he informed me that it was *Rosa rubella*.

Two years ago the late Mr. Storey, of Newcastle-on-Tyne, an able botanist, who was engaged in making a more accurate list of the plants indigenous in the counties of Durham and Northumberland, asked me to forward him specimens both in flower and in fruit (in the autumn). In 1857 and 1858 I duly investigated that part of the lane where I remembered that the plant from which I sent Mr. Winch the specimen was growing, but I only found what I thought was the same plant, although not in flower, or in fruit, in either of those years.

In June, however, of this year I was extremely pleased to behold one of the same plants in blossom, bearing two flowers of a lovely blush, or *pink* colour, of which the dried specimen I now

exhibit was one. The second flower I sent to Newcastle; and very near this bush, I found a second plant with three buds—not expanded—but evidently of the same rose, as the flower-buds were tinted at the ends, and in lines on the back of the folded petals with deep *pink*. The bud also exhibited is from this second shrub. I gathered all the flowers and buds, and thus I was unfortunately prevented from ascertaining this autumn the colour of the fruit.

One of the chief differences between the *R. spinosissima* and *R. rubella*, is that the fruit of the former, at first *red*, becomes when mature *black*, whilst that of the latter is said to continue *red* when ripe (see fig. 3. plate 2601, English Botany); this last is likewise distinguished by some botanists as being *pendulous*. Having last week examined the specimens of the *R. rubella* preserved in Mr. Winch's herbarium, I must say that the fruit there dried presents neither of these characters, but it is *black*, or purlish-black, and its stalk is straight, and by no means drooping or pendulous. I also noticed that my specimen was less set with glandular bristles on the flower-stalks than that of Mr. Winch's specimens; but the size and shape of the petals appeared much the same. Further, some of the leaflets, as in mine, have simple serratures, while others show a doubly serrated margin; and in both, the insides of the sepals are downy.

The flowers in my specimens when fresh were of a lovely pink, and in size are larger than the flowers of the *R. spinosissima*, with the petals more notched; but the colours of the flowers of *R. spinosissima* I have never seen other than *white*, or *yellowish-white*. My specimens seem, from the fewer bristles on the flower-stalks, to be rather intermediate between *R. spinosissima*, whose flower-stalks are *smooth*, and the *R. rubella* of Winch's herbarium. Compare also the figures in *plate* 187 and *plate* 2521 of the 'English Botany.'

I will leave for the consideration of those who are more familiar with the *Rosaceæ*, whether the *R. rubella* be really a *distinct* species.

MR. BENTHAM'S NOTE ON HOMALIUM.

In drawing up my synopsis of the genus *Homalium* (p. 38), I had unfortunately overlooked M. L. B. Tulasne's "Floræ Madagascariensis Fragmentum Alterum," in the 'Annales des Sciences Naturelles,' sér. 4, Botanique, vol. viii. p. 58, where five new species of *Blackwellia*, all from Madagascar, are described. I have not seen any specimens, so as to compare them with my own species; I can, therefore, now merely give here the list, with the affinities suggested by the perusal of the descriptions.

B. brachystylis (Tul. in Ann. Sc. Nat., sér. 4, vol. viii. p. 59), evidently closely allied to *B. axillaris*, Lam., or my *Homalium axillare*.

B. Thuarsiana (Tul. *l.c.* p. 60), evidently very near to *B. paniculata*, Lam., or *H. paniculatum*, Benth.

B. eriantha (Tul. *l.c.* p. 62) must also be closely allied to the same species.

B. micrantha, Bois. (Tul. *l.c.* p. 63), seems to differ in its slender racemes and smaller flowers with broader sepals and petals.

B. planiflora, Bois. (Tul. *l.c.* p. 64), probably differs still more in having the petals broader, longer, and more obtuse than the sepals.

G. B.

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THE END.

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SUPPLEMENT TO VOL. IV.—BOTANY.

CONTAINING

A SYNOPSIS OF THE DALBERGIEÆ,

A TRIBE OF THE LEGUMINOSÆ.

BY

GEORGE BENTHAM, Esq., V.P.L.S.

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LINNEAN SOCIETY OF LONDON.

Synopsis of *Dalbergieæ*, a Tribe of Leguminosæ. By GEORGE BENTHAM, Esq., V.P.L.S.

[Read June 2, 1859.]

WHEN, in the winter of 1836–37, at Vienna, I worked up the South American *Dalbergieæ* from such materials as I there found, I was induced to adopt to their fullest extent the prevailing ideas of the importance of the modifications of the fruit in the limitation of genera; for their evident constancy in the comparatively few species in which I could examine the flowers also, appeared to justify the great value attached to the characters derived from them. Since then, however, the great accession of specimens I have had at my disposal from the warmer regions of Asia, Africa, and America, where the trees and woody climbers constituting this tribe are equally abundant, has induced me considerably to modify my former opinions, and led me to what I conceive to be a fairer appreciation of the true value of these characters. As I have already had occasion to remark in my paper on *Clitoria*, read before the Society in 1857, the greater or less *degree* of development in different parts of the pod or its appendages, acquired during growth and maturation, which often makes a great difference in its external appearance, is of very little systematic value; whilst a tendency to development in one direction and not in another, or to produce appendages in one part rather than in another, often difficult to appreciate, is, on the contrary, remarkably constant in genera otherwise natural.

Different in appearance as are, for instance, the pods of *Drepanocarpus lunatus* and *Machærium villosum*, they are both formed, as it were, upon one plan, easily traced through the intermediate species, and the two genera are very unnaturally separated. On the other hand, a cursory glance at the pods of *Machærium* and *Tipuana* would suggest their generic identity, whilst a closer examination shows a considerable difference in the origin and formation of the winged appendage, and the distinctness of the two genera is confirmed by differences in the flower without any appearance of intermediate links; *Tipuana* being, in fact, much nearer to *Pterocarpus* than to *Machærium*. So also the *degree* to which the corky thickening of the pod is developed in certain cases makes a very great difference in the external appearance of the fruits of species which may be otherwise so closely allied that they cannot be generically separated; whilst the *tendency* to this corky development is observable only in certain genera, although it does not take place in all the species of those genera.

These considerations have obliged me to modify in many instances the circumscription and characters of the genera I proposed in my Vienna paper, and to reduce several of those which I considered as new, more especially those which I had founded on the fruit alone, without having seen the flower—always a very unsafe course, and particularly so among Leguminosæ. In one instance, indeed (that of the genus *Corytholobium*, which I had taken up from Martius's fruiting specimens and MS. notes, without either he or myself having seen the flowers), the plant turns out to be Polygalaceous. In a few other cases the flowering and fruiting specimens had been mismatched; a source of error very frequent in describing the tree-vegetation of the tropics. Travelling collectors have very seldom the opportunity of gathering specimens in both states from the same tree, and where these collectors are not very methodical and precise in the notes they take at the time of collecting, the memoranda attached to the loose fruits or flowers of their specimens in herbaria are not always to be depended on. Owing to the intricacy with which the branches of different trees and climbers are intermixed in tropical forests, fruits, flowers, and foliage, which the careless traveller fancies he has gathered from different branches of one tree, have belonged, in fact, to different trees; and mistakes are still more frequent when he picks up from the ground loose flowers or fruit, apparently fallen from the tree overhead. Moreover, I have occasionally met with convincing proofs that the memoranda attached to specimens had

not been made at the time of gathering, but added later—either in the course of drying, or at the time of packing up, when the recollection of the circumstances noted, of origin, habit, colour, &c., had become more or less dimmed or confused,—especially when a great variety of specimens had been gathered in one herborization.

Even now, whilst revising the same tribe after an interval of twenty-two years for the purpose of editing the Leguminosæ of Martius's 'Flora Brasiliensis,' although I have certainly had at my disposal a richer collection than had ever been gathered together in one place, and although I had in the meantime collected a considerable number of notes in the herbaria of Paris, Geneva, and others, still I have in many cases experienced much difficulty from the insufficiency of specimens, and many points remain involved in doubt and obscurity. As far, however, as my materials allowed, I have, in a forthcoming part of that 'Flora,' fully described all the Brazilian genera and species; an operation, which has obliged me to examine in detail all the species I could procure from the whole of tropical America, and to compare them carefully with the newest corresponding forms in tropical Africa and Asia. It then occurred to me that it might be interesting to the Linnean Society to communicate the result of that examination of such new or little-known genera and species as are not included in the Brazilian Flora, as well as to record a few general observations which the form and limits of that work prevented my entering into on that occasion. I have thus been led on to draw up a synopsis of the whole tribe, with short characters of all the species known to me, referring for more complete descriptions to the above-mentioned Brazilian Flora, or to other works quoted, for the published species, and entering into a few further details, only in the case of the non-Brazilian species here published as new.

The tribe of *Dalbergieæ* is on the whole a natural one, but, like all others of the Papilionaceous suborder, very difficult to define precisely. In general it is distinguished from *Phaseoleæ* by the arborescent or tall, woody, climbing stem, pinnate leaves, and indehiscent pod, and from the arborescent *Galegeæ* (*Robinia* and their allies), by the indehiscent pod, and, it has been said, also by the cotyledons which, during germination, are believed not to be developed into true seed-leaves, furnished with stomata. The latter character, however, if correct, is not available, and I cannot ascertain that it has been verified in a single species, and to the others there are occasional exceptions, each of which must be

judged of by a comparison of specific affinities. *Erythrina*, *Butea*, and some other *Phaseoleæ* are arborescent, and in *Butea* the pod is not always dehiscent, but the foliage is so characteristic of *Phaseoleæ*, that it is impossible to separate the genus from that tribe. So also *Apios tuberosa*, the *Clitorias* of the section *Ternatea*, *Galactia Elliottii*, and a few other *Phaseoleæ* have pinnate leaves, but their herbaceous twining stems, dehiscent pods, and specific affinities clearly point to their place in that tribe, and not among *Dalbergieæ*. In *Dalbergieæ*, again, there are one or two species in each of the genera *Lonchocarpus*, *Derris*, and *Platymiscium*, with only one pair of opposite leaflets at some distance below the terminal one, as in *Phaseoleæ*, but the pod is indehiscent and the specific affinities in each case, certainly those of *Dalbergieæ*. The small genus *Abrus* is an exceptional one which, besides its pinnate leaves, shows in some other respects an approach to the *Dalbergieæ*, but, upon the whole, it seems more nearly allied to *Phaseoleæ*, where its two-valved pod would technically place it. Between the arborescent *Galegeæ* and *Dalbergieæ* the line of demarcation is still more vague. From *Tephrosia*, *Coursetia*, and *Robinia* on the one side, to *Pongamia* and *Müllera* on the other, the genera *Gliricidia*, *Mundulia*, *Millettia*, *Derris*, and *Lonchocarpus* (with some smaller allied ones) form a gradual passage, the three first, with a more or less dehiscent pod, being perhaps best placed in the *Galegeæ*; the two last, in which it scarcely ever shows any tendency to split into the two valves, remaining in *Dalbergieæ*.

Several *Dalbergieous* genera are closely allied to corresponding ones among *Sophoreæ*, from which they are distinguished by the union of the stamens. The union, however, is not always so close as in the other tribes of synstemonous *Papilionaceæ*; the lower or carinal stamen is occasionally free, as well as the upper or vexillary ones, and in several genera the keel-petals only overlap each other on the outer edge without being united. In these respects, therefore, as well as in habit, and in the shorter and occasionally almost straight radicle, the *Dalbergieæ* constitute the passage from the preceding *Papilionaceæ* to the *Sophoreæ*, and, through them, an approach to the suborder *Cæsalpinieæ*.

The *Dalbergieæ* are all woody, and very few species remain low stunted shrubs; in a few, chiefly from the dry, hot regions of Africa and Southern India, some of the lateral or axillary branches, in conformity with a prevailing feature in the scrubby vegetation of those countries, are reduced to stout spines; but the great majority of species are hard-wooded trees, often of considerable size

and great beauty, or climbers of various degree, from the shrub or small tree with weak sarmentose branches, to the tall liane, twining up to the summits of the highest trees, or supporting themselves by their twisted petioles or hooked spinous stipules. In *Pterocarpus* and its nearest allied small genera, *Tipuana*, *Platypodium*, *Centrolobium*, and *Pœcilanthe*, in *Platymiscium*, and *Hymenolobium*, as well as in the *Geoffroyeæ*, all the species are arborescent. In the great genera *Dalbergia*, *Machærium*, *Lonchocarpus*, and *Derris*, as in the small genera technically distinguished from them, trees and climbers are irregularly mixed, and in some cases the same species is described as erect or scandent according to circumstances, whether growing isolated in an exposed dry situation, or drawn up in a moist shady forest. This identity, however, of erect trees with climbers, of which we have vague notices supplied by collectors in tropical regions, in the case of various natural orders, has not yet been very satisfactorily made out, and requires further observation on the part of intelligent and experienced botanists who may chance to be resident in hot countries, and can examine these trees in different stations and at different ages and periods of growth, uninfluenced by the prevalent and very natural ambition to raise to as high a figure as possible the numerical list of the new species they discover.

The wood of the arborescent species, as in the case of most Leguminous trees, is always hard and durable, and often of great beauty. Many are considered of great value as timber-trees, and largely exported to Europe for furniture, as being elegantly veined and susceptible of a high polish. Of the principal varieties of rosewood imported into this country, the two best, from Rio Janeiro (or rather from the interior through Rio Janeiro), are certainly supplied by species of *Dalbergia*, and chiefly by the *D. nigra*; other qualities are derived from some species of *Machærium*. The Honduras and Martaban rosewoods appear also to be the produce of some species of this tribe, and the tropical African rosewood or lancewood is certainly that of *Pterocarpus erinaceus* or *P. echinatus*. In Allemaõ's enumeration of the best timber-trees of the forests around Rio Janeiro, no less than thirty-five out of ninety-nine are Leguminous, and among these, eleven are *Dalbergieous*, chiefly *Dalbergias* and *Machæriums*, known to the merchants of the country under the names of *Jacarandas*, *Cabiunas*, &c. *Machærium Schomburgkii* and others, *Dipteryx*, &c., in Guiana, *Centrolobium* in Venezuela, *Piscidia erythrina* in the West Indies, are among

the tropical American ones specially noted for their woods. The *Red Sandars* and *Ruby-woods* of India are the produce of species of *Pterocarpus*, the *Sissoo-wood*, of *Dalbergia Sissoo*; and there is probably not a single tree in the whole tribe, of which the wood might not be worked with considerable advantage.

Several species supply gum-resins, such as the *Kino* from *Pterocarpus erinaceus* or *echinatus* in Africa, and from *P. marsupium* and *santalinus* in India. Gum-dragon is said to be produced by *Pterocarpus indicus* in Asia, and in tropical America by *P. Draco*, and by a species of *Pterocarpus* on the Orinoco, of which I have only seen two pods in the Kew Museum, more like those of *P. indicus* than of any American species known to me. Very similar resinous products are attributed to *Ecastaphyllum monetarium*, *Drepanocarpus lunatus*, and some others.

The roots, bark, and fruits of several species are known to be highly astringent, narcotic, or poisonous. All the species of *Andira*, commonly known in South America under the name of *Angelim*, are there considered as powerful anthelmintics. The *Lonchocarpi*, allied in botanical characters to *Tephrosias*, include, like them, several species used for poisoning fish; so also is the closely connected *Piscidia erythrina*. The fruits of several species, on the other hand, are much eaten in some countries, though we have occasional hints of their deleterious qualities, and they are probably never very palatable. Those especially noted as articles of food for the natives are *Pterocarpus esculentus*, and the similarly corky-fruited species or varieties of *Ecastaphyllum* in tropical Africa, the *Geoffroya superba* in North Brazil and Venezuela, the *G. spinosa* about Carthagena, and it is said also a species of *Dipteryx* known as *Almendron* in Antioquia. All the *Dipteryx* fruits or seeds are, however, more used under the name of *Tonga beans* or *Cumaroo* for scenting snuff or for their oil, one of them supplying the *Eboe* oil of the Mosquito country. The fruits of the *Pterodon* of South Brazil are still more replete with an oil which is there said to have powerful medical properties. The *Poonga* or *Kurunj* oil of India is the produce of *Pongamia glabra*. But, whether for food or for medical purposes, care is generally recommended in the use of all fruits and seeds of this tribe on account of their narcotic or intoxicating qualities, a principle which prevails more or less in the tribes nearest allied, especially in the arborescent *Galegeæ* and many *Phaseoleæ*, in which we find, in the seeds of closely allied species, important articles of food and virulent poisons.

Even the common *Phaseolus vulgaris* seeds, or *haricots*, are apt to be deleterious (and fortunately at the same time disagreeable to the taste) if stewed without throwing away the first water.

The geographical distribution of *Dalbergieæ* is somewhat affected by their uniformly woody habit, requiring years before they attain the reproductive age; for any isolated stragglers are, on that account, more exposed than the shorter-lived races to the chances which prevent their permanent establishment in a new locality, and the progress of their species is thus continually checked. They include none of those weeds of cultivation which everywhere follow man in his migrations. Valuable and ornamental as many of them are, very few appear to be ever cultivated or planted. Very few again are sufficiently maritime to admit of their being accidentally carried across oceans. An adventitious species is therefore of very rare occurrence, and the great majority have but a very limited area. There is thus not a single species common to Asia and America. Only five American species, *Ecastaphyllum Brownei* and *E. monetarium*, *Drepanocarpus lunatus*, *Lonchocarpus sericeus*, and *Andira inermis* have spread over to the opposite coast of Africa, and one, probably of African origin (*Pterocarpus esculentus*), has also been received from Cayenne. Among the Asiatic species one only, *Derris uliginosa*, extends across to Western Africa, and the same species with two others only, *Pongamia glabra* and (perhaps) *Derris scandens*, reach eastward as far as tropical Australia. Out of seventy-three Asiatic species, six only are common to the Peninsula and the Archipelago, two more extending from Ceylon to the Archipelago; out of twenty African species, two, or perhaps three, are known to be common to the eastern and western sides, and out of 200 American species, five only stretch from southern or even central Brazil to the West Indies or Central America.

The generic distribution is somewhat different. Regarded in this light, we must take natural genera only, those which have general differences traceable in their flowers or other organs, and not determined by the form of the pod, uniting *Ecastaphyllum* with *Dalbergia*, *Drepanocarpus* with *Machærium*, *Lonchocarpus Pongamia*, *Piscidia* and *Müllera* with *Derris*, *Andira* with *Geoffroya*, and *Pterodon* with *Dipteryx*. We shall then find the two largest genera and one smaller one common to three continents. *Derris* (or *Pongamia*), thus extended to eighty-four species, has thirty-two Asiatic, nine African (including one from Asia and one from America), and forty-five American species, the *Derris* form prevailing in Asia, but found also in America; whilst the *Loncho-*

carpus form, which prevails in America, is the only one in Africa, and is scarcely represented in Asia by *Pongamia glabra*. *Dalbergia*, with sixty-nine species, has thirty-seven Asiatic species, ten African (of which two are also in America), and twenty-four American species, the different groups not affecting any particular geographical area. *Pterocarpus*, with fifteen species, has three Asiatic, five African, and seven American species, those only with stipitate pods found in Asia, the sessile-podded prevailing in America, and the two forms distributed in Africa. Of the remaining genera, the two largest, *Machærium* with sixty-four species, and *Geoffroya* (including *Andira*), with nineteen species, are American, with two species of the former and one of the latter extending also into Africa. Seven more are exclusively American, viz., *Platymiscium* with thirteen species, *Dipteryx* with twelve, *Cyclolobium* with four, *Tipuana*, *Centrolobium*, and *Pœcilanthe* with three each, and *Platypodium* with only two. There remain three isolated species, of which *Euchresta* is Asiatic, *Ostryocarpus* African, and *Hymenolobium* American. Among the doubtful *Dalbergieæ* known to me, which do not appear referable to any of the described genera, but which, from the imperfection of the specimens, I am unable to determine, there are—one Asiatic, two African, and two American species.

Considering now the classification of *Dalbergieæ*, it will be found that the 286 species here described have (in so far as previously known) been distributed by various authors into above forty genera, now reduced to twenty-three, which appear to be tolerably well defined, although, to make them really natural, it would have required to cut them down, as above mentioned, to fifteen. It is not, however, so easy to determine the linear or relative arrangement of these genera. The best which has suggested itself to me is their distribution into three groups: the *Pterocarpeæ*, with dry fruits and the leaflets mostly alternate along the petiole; the *Lonchocarpeæ*, with dry fruits and the leaflets more strictly opposite; and the *Geoffroyeæ*, with a fruit usually drupaceous, and a single pendulous seed. The first of these, the *Pterocarpeæ*, may be considered as the more genuine representatives of the tribe; the fruit is always strictly indehiscent, usually hardened round the seed, which exactly fills the cavity it occupies, and almost always samaroid, that is, attenuated above or below the seed, or both, or all round, into a thin edge or wing. In the flower, it may be observed that the vexillum is never appendiculate or callous at the base, the wings are always free from the keel, the keel-petals are usually, but not quite always, shortly united at the outer edge;

the staminal tube is always split to the base on the upper side, and sometimes also on the lower side; the ovary often contains but a single ovule, and seldom more than four. The character derived from the foliage is tolerably constant; a very few species may be, however, occasionally found with the leaflets nearly opposite, and, in perhaps a majority of cases, one or two of the lowest pair of each leaf may be opposite, or nearly so, but always with the upper or intermediate ones alternate. There are also a few species (*Dalbergia Amerimnum, Ecastaphyllum Brownei,* and the four *Cyclolobiums*), in which the leaves are reduced to the terminal leaflet; the affinities of these must be judged of by other characters.

The second subtribe, the *Lonchocarpeæ*, form the approach to the arborescent *Galegeæ*; the fruit, always dry and usually flat, is nearly of the same consistence throughout, not specially hardened round the seeds, although often more or less contracted between them, so as, when not flat, to become torulose or moniliform, and when very flat, showing occasionally (but very rarely) a slight tendency to split, although never, so far as I have seen, really opening in two valves. The flowers afford no absolutely constant character, but in the majority of species the keel-petals are strictly united along the outer edge from the middle upwards, the wings often adhere laterally just above the claw to the keel, the vexillum has occasionally two calli, or the two edges folded in at the base of the lamina. The upper or vexillary stamen in *Lonchocarpus, Derris,* and *Piscidia,* is very shortly free at the base, then united the greater part of its length with the others into a complete tube, which splits open only when forced by the swelling of the ovary: an arrangement common in *Phaseoleæ* and some *Galegeæ,* but not observed in any *Dalbergieæ,* except these three genera. The ovules are often numerous. The character derived from the foliage is more constant: the leaflets are always strictly opposite, excepting here and there in a luxuriant side branch, where a tendency may be occasionally observed to break out into a slightly alternating arrangement. Stipellæ occur occasionally, but not frequently. In a very few species the leaflets are reduced to three, and in one, *Lonchocarpus,* they are solitary. In *Platymiscium* the leaves as well as the leaflets are opposite, which only occurs in the whole family of Leguminosæ in this genus, in some species of *Dipteryx,* and in a few genera, chiefly Australian, of *Podalyrieæ,* and *Genisteæ.* In inflorescence, *Lonchocarpus* and its nearest allied genera have also a peculiarity which brings them still more in connexion with

Galegeæ and *Phaseoleæ*: the pedicels are usually clustered two or more together in the axil of the same bract; when they are more than two, the axis of the cluster often forms a thickened gland-like node, or lengthens into the rachis of a very short lateral branch.

The third subtribe, the *Geoffroyeæ*, is technically characterized by the fruit, which, in most cases, is a real drupe. It is said by some to be two-valved. In the few species in which I have seen it ripe (one *Geoffroya*, three *Andiras*, four species of *Dipteryx*, and two of *Pterodon*) the endocarp showed no more signs of splitting than do the stones of almonds or cherries in their ordinary state, but, like these, it is probable that the stones of the *Geoffroyeæ* may open in germination along the sutures; a circumstance, which would not bring them under dehiscent fruits properly so-called. The sarcocarp in most *Geoffroyeæ* clings hard to the stone, and most probably rots away in germination, but in *Pterodon* it appears to fall off in two valves, leaving the flat and thin but woody putamen still adhering to the specimens, so as to have been occasionally described as the whole fruit. When in flower, the *Geoffroyeæ*, as a whole, have little to distinguish them absolutely from other *Dalbergieæ*, although each genus has characters of its own which may be traced in the flower as well as in the fruit. The foliage is variable, though always pinnate; the keel-petals free, or very slightly cohering at the top; the staminal tube split open on the upper side, but never on the lower side; the ovary short, usually thick, with never more than four ovules, of which only one ripens into a pendulous seed, and in *Dipteryx* and *Pterodon* even the ovule is solitary.

Before proceeding with the technical enumeration, I subjoin a few general observations on individual genera.

DALBERGIA and ECASTAPHYLLUM.

These two closely connected genera are readily distinguished by their anthers, which are not, as in all other *Dalbergieæ*, versatile with parallel cells opening longitudinally, but small, erect, and didymous; their cells placed back to back, opening in diverging or divaricate slits, which are either so very short as to be reduced to oblong terminal pores, or are more or less continued to the base of the anther; in the former case the two cells are often quite distinct at the top, projecting considerably above the connectivum; or when the cells open longitudinally they are usually contiguous at the apex, spreading widely at the base. In some semidiœcious species the two forms of anthers are represented in the two sexes.

In other respects, also, the two genera form a natural group; the leaflets are either all alternate, or rarely a few pair in each leaf may be found opposite or nearly so, and always without stipellæ; in one *Dalbergia* and one *Ecastaphyllum* the leaf is reduced to a single large terminal leaflet. The inflorescence is more decidedly cymose than in any other genus of the tribe, and perhaps of the whole order. The primary branches of the panicle are usually alternate, the next ramifications are dichotomous, and the ultimate branchlets bear several flowers, sessile or pedicellate, arranged singly along their upper or inner side only, with a small bract under each pedicel, and two bracteoles under the calyx. Sometimes the inflorescence is dichotomous from the base, with innumerable small flowers forming a perfect flat cyme. Sometimes it is only in the last ramifications that the cymose arrangement can be traced, or the whole is reduced to one or to very few racemes, but these are then always unilateral. A similar arrangement, although much less decided, may be observed in several *Machæria*, but is quite lost in *Pterocarpus*, *Lonchocarpus*, and their allies. The flowers in *Dalbergia* and *Ecastaphyllum* are white, straw-coloured, or purple-red, never, as far as I can learn, really yellow, and they are generally the smallest in the tribe; in some species not above one line long, generally from that to three lines, and only very rarely five, or even near six lines long.

The pod was the character formerly relied on chiefly, if not solely, for the separation of *Dalbergia* from other Leguminosæ—an oblong or linear thin flat indehiscent pod with one flat seed in the centre, in a cavity not much bigger than itself, or, if more than one seed, then always at some distance from each other, and each in its own cavity. The consequence of such a limitation was the including in *Dalbergia* species very different in foliage, inflorescence, and flowers, now referred to *Derris* and *Lonchocarpus*, and would now necessitate the adding to it *Platymiscium*, *Leptolobium*, and many other widely distant genera which have the same pod, and the exclusion from it not only of *Ecastaphyllum*, but also of those species universally retained in it which constitute my section *Selenolobium*. I have now, however, as already observed, very much restricted the generic importance I would attach to modifications of the pod, and were I now first grouping the species before me, I should certainly have proposed the uniting them all under *Dalbergia*, divided into three artificial sections:—*Dalbergia*, with a straight, long, thin pod; *Selenolobium*, in which it is thicker and lunate or reniform; and *Ecastaphyllum*, where it is orbicular

or nearly so, with a great tendency to a corky thickening. The latter group has, however, been so long established as a substantive genus, and is so well known under that name, that it may be more convenient so to retain it, although artificial.

There are, however, several small genera proposed at different times, which I have been obliged to reduce to *Dalbergia*, although I may have adopted them in my Vienna memoir, not having then perfect specimens in flower and fruit of the true Asiatic *Dalbergias* for comparison. *Triptolemea*, Mart., with its compact cymes of minute flowers, looked distinct enough from *D. lanceolaria*, but is certainly inseparable from *D. rimosa*. *Miscolobium*, Vog., with its smooth unveined pod, has its counterpart in several of the African and Asiatic *Sissoas* and *Dalbergarias*, among which the passage into the forms exemplified in the American *D. variabilis* and the Asiatic *D. rimosa* is very gradual. *Amerimnum*, Sw., has the inflorescence and flowers of *D. nigra* and others among American species, or of *D. latifolia* and its allies among Asiatic ones; and the pod, although sometimes rather more thickened, is often quite as thin as in the majority of *Dalbergias*, and similarly reticulated over the seeds. *Podospermum*, Hochst., and *Endospermum*, Blume, are both common forms among true *Dalbergias*.

In the distribution of the numerous species of the genus into groups I have had considerable difficulty, for, notwithstanding the great similarity in the modifications observable in the American species and in the corresponding Asiatic ones, I have found characters apparently constant in one set, much less so in the others; and this will account for some diversity in the principles on which I have established my sections in the several successive sketches I have given of the genus (in the 'Wiener Annalen,' in the 'Plantæ Junghuhnianæ,' and in Martius' 'Flora') according as I have been working up the American or the Asiatic species. Taking now a general view of the whole genus, after the artificial separation of one American and two Asiatic *Selenolobia* by their peculiar fruit, I can find no character among the remaining sixty odd species, which shall mark out definite sections equally applicable to those of the new and of the old world. I have, therefore, following the rule laid down by De Candolle for similar occasions, distributed them into *series* only, distinguished by no essential character, and connected with each other by intermediate links, either American, Asiatic, or African; but which may yet serve as a help to specific determination, and as a guide to the study of the various modifications presented to us without departing from the generic type.

Commencing with the *American* or true *Triptolemeas*, we have a group clearly distinguished on that continent by their very small, numerous, strictly cymose flowers always practically diœcious—(that is to say, that in the male or barren individuals the ovaries have either no ovules or only scarcely percepticle rudiments of them, and the flowers all drop off without setting, and in the female or fertile ones the anthers are differently shaped from those of the males, and probably imperfect)—and by their pod indurated and strongly reticulate at the seed-bearing part; and no American species presents any intermediate between these and the *Miscolobiums*. Passing on to the corresponding Asiatic and African forms, we have the *D. rimosa* and its immediate allies, which have precisely the pod of the *Triptolemeas* and also their inflorescence and flowers, except that I always find perfect ovules in the flowers even of those individuals in which they never appear to set. This series I have designated as the *Old-world Triptolemeas* (*Triptolemeæ geronitogeæ*), characterizing them chiefly by the inflorescence and small flowers, with very short claws to the petals, the vexillum being usually almost sessile. Some species, however, such as the Chinese *D. Miletti* and the African *D. armata*, are almost as closely connected both in flowers and in fruit with *D. sympathetica*, *D. Stocksii*, &c. among *Sissoas* as with the other *Triptolomeas*, so as to preclude any definite limitation. Returning to America, there remain fifteen species which may be termed *American Sissoas*, or *Miscolobiums*, including *Amerimnum* as limited by De Candolle. They all agree in the smooth or scarcely reticulated pod, and in the more irregular inflorescence and rather larger pod of the generality of Asiatic *Sissoas*, and may be subdivided according to the calyx, or to the presence or absence of the tenth stamen. In the corresponding Asiatic and African forms the venation of the pod varies in different species, and the tenth stamen may be present or absent in different flowers of the same species, and neither of these characters gives much assistance in their delimitation or distribution; but the distinction between the monadelphous species and those where the staminal tube is split into two equal bundles, affords the means of dividing them into two long-recognized groups, the *Old-world Sissoas* and the *Dalbergarias*; whilst the same character is not even of specific constancy among the American species.

Ecastaphyllum, or *Hecastophyllum* as some modern purists would have us write it, consisting but of five species, requires no subdivision.

Cyclolobium.

A genus of four closely allied South American species, whose immediate affinities I cannot satisfactorily trace. The inflorescence is nearly that of the subracemose *Dalbergiæas*, the fruit orbicular as in *Ecastaphyllum* and *Pterocarpus*, thin, with a marginal wing as in some *Derrises*, but it has neither the anthers of the two former, nor the habit or flowers of the two latter genera. In all the species the leaflets are solitary and terminal, so that their relative arrangement is no guide; but I have placed it amongst the genera with alternate leaflets, because the inflorescence and flowers indicate no affinity with *Lonchocarpus* and its allies.

Machærium and Drepanocarpus.

These two genera, so closely connected with each other as not to be distinguishable without the fruit, were widely separated by the older authors. Even De Candolle, leaving *Drepanocarpus* next to *Pterocarpus* among *Dalbergieæ*, united *Machærium* with *Nissolia* among *Galegeæ*, characterizing it by the papilionaceous corolla, united stamens and samaroid fruit. The true *Nissolia* has, however, since been shown to be *Hedysareous*, and *Machærium* to have all the characters of *Dalbergieæ*. In this tribe the latter genus is readily known by its constantly monospermous pod extended into a wing proceeding from the apex, not from the base as in *Platypodium*, the remains of the style being at the summit of the wing, not forming a spur at its base, as in *Centrolobium*, and the venation of the wing showing that it is an attenuation of the end of the pod, not a lateral appendage to the style, as in *Tipuana*. In flower, *Machærium* is always distinguished from *Dalbergia* and *Ecastaphyllum* by the versatile anthers, and generally from *Pterocarpus* and its allies by the shape of the calyx, the downy vexillum or other characters not quite universal, and from *Lonchocarpus* and its allies by the leaflets mostly alternate, by the wings free from the keel, by the staminal tube never forming a complete sheath, &c. Some species may, however, without the fruit, be confounded at first sight with *Andira*, but the keel-petals united near the apex, the single (very rarely 2) ovules, the smaller flowers, and general habit, will, in most cases, separate the *Machæriums* even before the ovary is at all enlarged.

I have enumerated fifty-six species of *Machærium*, all American, and affording still less than *Dalbergia* any characters in flower or fruit by which they can be divided into sections. All that I have

been able to do for the convenience of study is, to distribute them into five series founded on the form and venation of the leaflets, and partaking of all the uncertainty and indefiniteness usually attending on characters of that kind.

Drepanocarpus, united by Linnæus with *Pterocarpus*, is, when in flower, precisely the same as *Machærium*, and several of the species assume several of the different types of foliage observed in that genus. The fruit is also formed upon the same plan, although it is at first sight so different in shape that the two have seldom, if ever, been brought into comparison. The differences, however, consist only, first, in the indenture on one edge opposite the seed being much deeper, and the corresponding curvature of the opposite edge much greater, giving the pod a reniform or circinate shape, instead of being nearly straight; and secondly, in the upper end of the pod being not at all or scarcely perceptibly attenuated into a wing. They are, therefore, differences in degree and not in plan, and I should have united the two genera as artificial sections of one, were it not that, as with *Ecastaphyllum*, *Drepanocarpus* is an old-established and universally adopted genus, recognizable by a tolerably positive, though purely artificial character. The only tendency towards an intermediate form of pod among known species may be traced through *Machærium Moritzianum*, *M. leucophyllum*, and *Drepanocarpus cristacastrensis*.

Tipuana, Platypodium, Centrolobium, and Pterocarpus.

These four small genera, each with its own peculiar habit and characters, have all several points in common. The pod, as in *Machærium*, is more or less samaroid, indehiscent, and flattened, thickened round the seed, and tending to expand in one direction or another into a wing. It is usually one-seeded, as in *Machærium*; sometimes, however, two, or even three seeds will ripen. They are then not distant, and separated by a thinner or contracted part of the pod, as in *Dalbergia* or *Lonchocarpus*, but close together in the thickened part, separated only by thin but hard or woody transverse partitions. The flowers are usually larger than in *Machærium*, often yellow, and the inflorescence looser, the calyx (except in *Centrolobium*) turbinate or narrowed at the base, the narrow part lined with the petal-bearing disk, whilst in *Machærium* the calyx is almost always rounded at the base, with the disk very short. The petals are always glabrous, and often waved or crisped on the edges, the wings free, the staminal sheath slit open on the upper side, and the anthers versatile. The species of the four genera

are, I believe, all erect trees, not climbers, the leaves alternate, and the leaflets also usually alternate, although sometimes in *Centrolobium* less decidedly so than in the three other genera.

Of the four genera, *Tipuana* is the nearest to *Machærium*, of which I had formerly considered it to be a section, owing to the apparent similarity of the pod, but the inflorescence and flowers are certainly nearer to those of *Pterocarpus*; the pod occasionally ripens two or three seeds, and the differences in its shape, pointed out by Allemaõ, are more structural, and consequently important, than they would at first appear. The venation of the wing especially shows that it should be rather considered as a lateral appendage to the style, than as an attenuation of the pod itself. This distinction may be well traced in the young ovary shortly after the flowering is over.

Platypodium closely resembles *Tipuana* in foliage, inflorescence, and flowers, but the pod is quite distinct in structure; the wing proceeds from the stipes, not from the base of the style. When detached it has much apparent resemblance to that of *Tipuana* in shape, but it is as it were reversed, being attached by the end of the wing, not by the seed-bearing end. The difference may be very early traced in the growing ovarium, besides that, in the only two known species, the lowest as well as the uppermost stamen is free in *Platypodium*, whilst in *Tipuana* all are united, or only the upper one free.

Centrolobium has a peculiar coarse habit, and the calyx is different from that of any of the adjoining genera. The pod is very large, resembling those of *Machærium* and *Tipuana* in shape, the wing proceeding from the apex, but the remains of the style, instead of being at the summit of the wing, form a lateral spur at its base. The seed-bearing part is also, in the few known species, thickly covered with long straight prickles.

Pterocarpus, the principal genus of the group, has the characteristic calyx and flowers above mentioned, but, in the fruit, instead of the oblong wing either above or below the seed-bearing portion, the pod is more or less attenuated at the edges all round it. In general shape it is usually nearly as broad as long, more or less irregularly orbicular or oval; the veins marking the course of the style often much curved above the seed, so that the remains of the free part of the style often appear very low down the inner edge of the pod. In the typical East Indian species the seed-bearing centre is more or less thickened, woody, or slightly corky, and the broad edges all round are very thin, with a very lateral style. In

the *P. erinaceus* the shape is nearly the same, but the centre is covered with straight prickles. In the *P. Draco* the pod is still more oblique, and the very thick and corky seed-bearing part is surrounded by a much narrower thin edge, which is sometimes reduced to a mere keel. In *P. Rohrii* and some others the centre is but slightly thickened, the greater part of the large orbicular pod being thin and almost membranous. In the African *P. lucens* and *sericeus* and the American *P. ancylocalyx* the consistence of the whole pod is more uniform, the centre is but slightly thickened, and the edges are not membranous, the pod is also straight and not so broad, varying in the same species from three quarters to not half as broad as long. All these differences, though slight in the plan of the pod, are so striking in outward appearance, that they have long since been made use of to establish sections, which I formerly proposed to raise to the rank of genera. But a careful comparison of the more ample materials we now possess has convinced me that most of such differences are specific only, and I have therefore now reunited *Echinodiscus*, *Moutouchia*, *Amphymenium*, and *Ancylocalyx* with *Pterocarpus*. De Candolle's section *Ateleia*, of which he had not seen the flowers, comprises one or two species of an otherwise unpublished *Cæsalpineous* genus, with a Cape species of *Viborgia*. My *Phellocarpus* was founded on a deformed corky state of the fruits of a *Pterocarpus*, probably *P. ancylocalyx*.

Pœcilanthe.

Under this name I have published three South American species, evidently congeners of each other, and allied to *Pterocarpus*, but differing somewhat in habit, in the more regular and deeply cleft calyx, and in the short keel. The perfect fruit is not known for certain, but shortly after flowering the growing ovary is already very different from that of *Pterocarpus*, being long and narrow, with several ovules; and, if my conjecture is right, that Velloso's figure of his *Pterocarpus falcatus* (Fl. Flum. vii. t. 93) represents my *Pœcilanthe grandiflora*, the pod would be in some measure intermediate between those of *Pterocarpus* and *Lonchocarpus*.

Among Fendler's Venezuelan plants is a remarkable one distributed under the No. 2223, which is also evidently allied to *Pterocarpus*, but the calyx, pointed and closed in the bud, appears always to open by a longitudinal slit, becoming, as it is termed, *spathaceous*. In the specimen, however, which I have seen, the flowers are only commencing to expand, and there is nothing to

indicate the direction in which the fertilized ovary would enlarge. I have therefore not ventured to fix its generic affinities.

Platymiscium.

A small genus of about thirteen species, all American, and at once known by the leaves, constantly opposite or ternately verticillate,—an arrangement unknown in any other pinnate-leaved Papilionaceæ, excepting a few species of *Dipteryx*, which, whether in flower or in fruit, cannot for a moment be confounded with it. The *Platymisciums* are all glabrous, except a slight hairiness on the racemes of a very few species. The flowers are yellow, as in *Pterocarpus*, which they resemble in many respects. The fruit is flat and very thin, as in some *Dalbergias* and *Lonchocarpi*, but the flowers have neither the peculiar anthers of *Dalbergia* nor the closed staminal tube or adherent alæ of *Lonchocarpus*. The species are, however, very difficult to characterize. In many cases, the leaves are not fully developed at the time of flowering, and the leaflets very deciduous when the fruit is advanced. The specimens in herbaria are therefore usually very unsatisfactory, and several of the forms here described as species may possibly, when better known, have hereafter to be united.

Hymenolobium and Ostryocarpus.

Two isolated flat-fruited species, with the foliage of *Lonchocarpus*, but with the wings entirely free from the keel, and the stamens never forming a complete tube. In the *Hymenolobium*, from South America, the flowers are nearly those of the *Andira amazonum*, but the thin broad membranous pod is very different from that of any true *Andira*. *Ostryocarpus*, from tropical Africa, is much nearer *Lonchocarpus*, but the anomalies in the petals, stamens, and pod prevent the joining it with that genus without giving to the latter a character too vague for practical use. I have been obliged, therefore, to leave these two plants as single species of detached genera.

Lonchocarpus, Derris, Pongamia, Piscidia, and Müllera.

These five genera constitute a natural group distingnished among *Dalbergieæ* by their inflorescence, by their wing-petals adhering to the keel by means of a lateral fold or protuberance immediately above the claw, and by the tenth or upper stamen, which, although free and at some distance from the others at the very base, is generally united with, or at any rate in close contiguity with the

others in the middle,—all characters closely connecting them with the woody *Galegeæ*. The majority of species are tall, woody climbers, with a very few arborescent ones; all have alternate pinnate leaves with opposite leaflets (reduced only in the case of the *Lonchocarpus unifoliolatus* to a single terminal leaflet), and purple-reddish, white or very pale straw-coloured flowers, never really yellow. There is indeed so much conformity in the structure of their flowers and in the general plan of their pods, that I should have had no hesitation in uniting them all into one large genus divided artificially into sections, were it not for the inconvenience, already alluded to, of suppressing long-established and universally recognized genera, when they can be marked out by a tolerably positive character, however artificial and isolated that character may be.

This delimitation, and even the precise separation of the whole group from the *Galegeæ*, is, however, in this instance, attended wih considerable difficulty. Out of rather more than eighty evidently distinct species, there are still about twenty in which the pod is entirely unknown, and several more in which it has been seen only in a half-grown state, and much remains to be learnt with regard to a great part of the group. Originally, the few species known to earlier botanists were mostly referred to *Robinia*, which became a general receptacle for Papilionaceous trees with united stamens and a flat pod, whilst the climbers were inserted promiscuously into *Robinia* or *Dalbergia*. When these old groups were broken up, the American species were generally referred to *Lonchocarpus*, and the Asiatic ones distributed under *Pongamia* and *Dalbergia*. In my Vienna memoir I proposed no alterations in this respect, for the American *Lonchocarpi* had been usually referred to *Galegeæ*, a tribe which I had not then time to work up, and I had scarcely any materials for the Asiatic genera. Nor did Vogel publish any revision of the few Brazilian species, and to the present day *Lonchocarpus* remains in a state of utter confusion, not a little increased by the creation of detached genera founded upon supposed discrepancies in the form of the pod, without any attempt at investigating what should be considered as the limits of variation of that organ in the true *Lonchocarpi*. The Asiatic species were partially worked up by Wight and Arnott with that care which characterized the whole of their Peninsular 'Prodromus.' They judiciously distinguished the *Brachypterums* from the true *Dalbergias*, and their new genus *Millettia* from *Pongamia*. Since then, I sketched out, in a note to the 'Plantæ Junghuhnianæ,' the principal groups sug-

gested by a general consideration of the Asiatic species, and these groups have been adopted by Miquel in his 'Flora van Nederlandsch Indie,' with the addition of two new small genera, but none of us had attempted any comparative examination of the American and Asiatic species. This investigation I have now been compelled to take up, in order to give some precision to the generic characters for Martius' Brazilian Flora, and the result has been a redistribution of some species, and a reduction of seven or eight small genera whose characters proved to be of no more than specific value.

After a general examination of all the species of which I had specimens, the first difficulty occurred in establishing a line of demarcation between such of these genera as should be retained among *Dalbergieæ*, and the arborescent *Galegeæ* with which they are so closely connected, and I confess that I have been unable to find any character more precise than that of the pod, indehiscent in the former, opening in two valves in the latter. This distinction may indeed be often inferred from the inspection of the ovary, of which the cavity is usually larger in proportion to the ovules, where the valves are afterwards to become free, than when they remain firmly adherent all round the seeds, and it is frequently accompanied by differences in habit, and other unimportant characters; still the passage from the one to the other is, in some instances already alluded to, so gradual, that the limits between the two tribes remain far from satisfactory.

This definition has obliged me in the first place to bring into *Dalbergieæ* all the true *Lonchocarpi* as well as *Müllera* and *Piscidia*, in which the valves cohere as closely round the seed as in any admitted *Dalbergieæ*, and, on the other hand, I have retained in or referred back to *Galegeæ* the *Gliricidias* included by DeCandolle under *Lonchocarpus*, Arnott's genus *Millettia*, and all those closely-allied species for which I had proposed the genera *Mundulia* and *Otosema*, in all of which the pod, though often thick and hard, or almost woody or fleshy, still appears always to open in two valves when quite ripe. To the same group belong *Marquartia*, Vog., described as having the stamens free,—an error arising from the examination of very young buds before the staminal sheath has grown up; *Padbruggea*, Miq., in which, however, the ripe pod has not been seen; *Berrebera*, Hochst, and *Fornarinia*, Bertol., all evidently congeners of *Millettia*, or of its two above-named allies. How far these three genera should be reunited or remain distinct, and how far they should be distinguished from the American *Gli-*

ricidia and *Wisteria*, is a subject I reserve for future consideration, none of that set of *Galegeæ* having come within the Brazilian flora.

Returning to the *Lonchocarpoid* genera which I have brought into or retained in *Dalbergieæ* under the five names which head this article, it will be seen that I have, on the sole consideration of the pod, maintained as distinct, for the reasons above mentioned, the three isolated species so long known as *Pongamia*, *Piscidia*, and *Müllera*, adding, however, to the latter Zuccarini's *Cyanobotrys*, and distributed the remainder under *Lonchocarpus* and *Derris*, the former consisting of thirty-eight American species, seven African, and one common to both continents, and including *Neuroscapha*, Tul., *Sphinctolobium*, Vog., *Philenoptera*, Fenzl, whilst *Derris* consists of three American and twenty-nine Asiatic species, including *Brachypterum*, W. & Arn., and *Aganope*, Miq. In *Lonchocarpus* the pod is flat, considerably longer than broad, varying in every possible gradation from the thin, paper-like consistency which characterized the *Philenoptera*, Fenzl, to the thick, hard substance of *Sphinctolobium*, without any longitudinal wings, but with a frequent tendency to thicken at the seed-bearing suture, especially at the point of insertion of the seeds, sometimes giving the edge a flat or concave surface of above 3 lines in breadth; and it was this peculiarity, observed in its greatest degree, that suggested Tulasne's genus *Neuroscapha*. I have, however, been able to make but very little use of these differences in establishing sections of the genus, and have been obliged again to have recourse to its subdivision only into series, founded chiefly on inflorescence, and partially also on indumentum, and on the presence or absence of callous thickenings or appendages at the base of the vexillum; the latter a character which, although of specific constancy, proves of less importance for sectional or generic distinction than I at one time believed it to be.

Derris has the flat pod of *Lonchocarpus*, varying likewise in consistency from thin and membranous to thick and almost woody, without, however, any special thickening of the upper suture; and it is generically distinguished by the upper edge, and sometimes the lower one also, being bordered by a narrow longitudinal wing, which varies, like the pod itself, in consistency, but is always distinctly marked off by a prominent longitudinal vein or nerve on each side indicating the real suture. In the subdivision of the genus, characters rather more marked seemed to warrant the establishment of sections, although they are too artificial to be con-

sidered as genera. The two which pass the most into each other are the two first, *Brachypterum* and *Euderris*, hitherto universally regarded as separate genera; the flowers and inflorescence are the same in both, the vexillum has no callosities, the stamens are all united (except in one American species, where the tenth stamen is often very early isolated), and the pod is winged on one edge only; the only difference consists in the shape of the pod, narrow, pointed, and more *Dalbergia*-like in most species of *Brachypterum*, broad and rounded at the top in most species of *Euderris*; but *D. guianensis*, *D. javanica*, and one or two others are intermediate, as it were, between the two. The third section, *Dipteroderris*, has the vexillum and stamens of *Euderris*, but usually a more paniculate inflorescence, the pod generally thicker and winged along both sutures instead of along the upper one only. In one species, however, the wing of the carinal or lower suture often disappears, varying much on the same specimen. The fourth section, *Paraderris*, has the stamens and pod of *Euderris*, except that the latter is usually thicker and harder, but the vexillum is thickened at the base into two small callosities or inflected appendages; the inflorescence is also peculiar, the fascicles or short side-branches of the raceme (or racemiform panicle) are pedunculate, not closely sessile as in the other sections. *Paraderris* includes also the only true *Derris* which has the vexillum silky-hairy, as in so many *Lonchocarpi* and *Millettias*. Lastly, the fourth section, *Aganope*, with the vexillum and pod of *Dipteroderris*, has the tenth stamen always quite free, with a thyrsoid inflorescence approaching that of the paniculate *Brachypterums* and *Dipteroderrises*. This sectional name is taken from that of Miquel's proposed genus *Aganope*, although without the same limits, for Miquel distinguished *Derris* and *Aganope* by attributing to the former monadelphous stamens and a pod usually one-winged only, and to *Aganope* diadelphous stamens and a two-winged pod; but the two latter characters are known to go together in one species only, the *D. thryrsiflora* (*Aganope floribunda*, Miq.); *D. marginata* (*Aganope marginata*, Miq.) has monadelphous stamens with a two-winged pod, and *D. sinuata* diadelphous stamens with a one-winged pod.

I adopted for the whole genus Loureiro's old name, *Derris*, because I could clearly identify it with his character, but I have been unable to take up the names of either of his two species; for the one, *D. pinnata*, of which he had not seen the fruit, proves to be the common *Dalbergia tamarindifolia*; the other, *D. trifoliata*, is a trifoliolate variety, or rather specimen, of a species which has

usually five leaflets; the name was therefore very inappropriate, and the species, a very common one, is so well known under Willdenow's and Roxburgh's name of *uliginosa*, that I have preferred the latter, although not of so old a date.

Pongamia was established by Ventenat for the *Robinia mitis* of Linnæus, or *Galedupa indica* of Lamarck, the name of *Galedupa*, although older, being suppressed, as the plant proved not to be the *Caju-Galedupa* of Rumphius, as was at first supposed. Several species have since been added, but they all belong either to *Derris* or to *Millettia*, and *Pongamia glabra* again remains alone, unless it be united with *Lonchocarpus* and *Derris*, in which case Loureiro's name, being the oldest, would have to be adopted for the whole group, and *Lonchocarpus* and *Pongamia* would be reduced to sections.

Piscidia is a Linnean genus consisting of a single species, remarkable for the four broad longitudinal wings of the pod, which are lateral expansions of the sutures. Linnæus did, indeed, distinguish two species, one with continuous wings, the other with the wings here and there interrupted between the seeds; but these interruptions have since been shown to be owing only to the accidental abortion of ovules, and consequent non-development of the corresponding portions of the pod, and to be very inconstant in the same specimens. In flower it is sometimes difficult to distinguish the plant from some specimens of *Lonchocarpus guatemalensis*. The plants, since referred to *Piscidia*, are chiefly species of *Sesbania*, in which the pods are similarly four-winged.

Müllera of Linnæus was again founded on a single species on account of its remarkable pod, which, in its more perfect state, resembles a string of large beads. Not uncommon in Cayenne, it has given rise to much confusion in synonymy. Aublet, not having identified it with Linnæus' character, published it under the name of *Coublandia*; and again (having a loose fruit, reduced by abortion to a single seed, and which then is nearly globular), he figured it as the pod of his *Deguelia*, his flowering specimens of *Deguelia* being those of of my *Derris guianensis* (*Lonchocarpus pterocarpus*, D C.). Miquel, having at first seen specimens in flower only, struck with their close resemblance to those of *Sphinctolobium virgilioides*, Vog., described them as a new *Sphinctolobium*, till the receipt of fruiting specimens enabled him to recognize Linnæus' *Müllera*, and he was then led to conclude that even Vogel's *Sphinctolobiums* might be reduceable to *Müllera*. Their fruits are, however, all flat, and *Müllera* may be kept up for those species of which the thick fruit

is nearly circular in its transverse section. It would thus include *Cyanobotrys*, Zuccar., which differs in the pod being much less constricted between the seeds. Its flowers and foliage, if rightly matched by Zuccarini, are precisely those of another *Lonchocarpus*, the West Indian *L. violaceus*.

Euchresta.

A single species, the history and characters of which have been well elucidated by Bennett in the 'Plantæ Javanicæ Rariores.' In many respects it comes very near to some *Sophoras*, but the united stamens refer it without doubt to *Dalbergieæ*. In the present arrangement it is intermediate, as it were, between the *Lonchocarpuses* and the *Geoffroya* groups. The inflorescence, ovary, and seeds are those of *Geoffroya*, whilst the foliage, united keel-petals, and thin pericarp bring it nearer to the *Lonchocarpoid* genera.

Andira and Geoffroya.

These two genera, originally united under the latter name, are certainly very closely allied to each other. Considered together, their flowers and foliage have nothing remarkable, resembling so much those of some other *Dalbergieæ* that some of their species have in that state been occasionally confounded with *Machæriums* or *Lonchocarpuses*. They may, however, be generally distinguished from both those genera by their free keel-petals and more pendulous ovules; and their fruit is very different, having a more or less succulent external sarcocarp, with the endocarp more or less hardened, and occasionally thick, and almost woody. In the half-grown or unripe state in which the fruits are sent by collectors for the herbarium they show no generic difference between *Andira* and *Geoffroya*, and but very little in the several species, varying chiefly in size and somewhat in shape,—more or less compressed, ovoid, or nearly globular, straight or oblique, obtuse or pointed. The fully ripe pods are but little known; they have been but very seldom and very vaguely described when fresh, and in our collections they are very scarce, and generally more or less contracted or otherwise altered by desiccation; so that, whatever diversity they may really show, they afford very little assistance in the characterizing species, still less in the delimitation of the two genera. I should, indeed, have proposed their reunion but for rather prominent differences in habit. *Andira* has branching panicles of violet, pink, or purplish sweet-scented flowers, whilst

in *Geoffroya* the flowers are yellow and fœtid, in simple racemes. To this may be added that the calyx is broader, less oblique, and less deeply toothed in *Andira* than in *Geoffroya*, the former approaching more to the habit of *Machærium*, the latter to that of *Pterocarpus*. The arrangement of the leaflets is variable in both genera.

The species of *Andira* present in many instances considerable difficulty. After deducting the *A. Amazonum*, whose characters, if confirmed by the fruit, may possibly be considered as generic, and the well-marked *A. cujabensis* and *A. cubensis*, the remainder, although widely different in extreme cases, seem to pass so gradually into each other that their delimitation seems more uncertain than in the case of any other *Dalbergieæ*; and although I have now considerably reduced the species which I had originally established from almost solitary specimens, it is not unlikely that, when better known, some of those I have still retained may prove to be varieties only. The *Geoffroyas* appear to be better defined, but, with the exception of the widely-spread *G. superba*, they are as yet scarcely known but from single specimens.

DIPTERYX and PTERODON.

This is another pair of closely allied genera, forming a little group readily distinguished among *Leguminosæ* by the form of the calyx and petals. The petal and stamen-bearing disk lines the whole of the short tube of the calyx, of which the two upper lobes, large and oblong, are closely pressed against each other, face to face in the bud, and entirely enclose the petals, the minute lower lobes forming a scarcely perceptible lower lip, resembling in the bud a small outer scale at the base of the upper lobes. The wings of the corolla are notched or bifid, which does not occur, to my knowledge, in any other *Papilionaceæ*, and the only approach to the above-mentioned structure in the calyx is in Mr. Spruce's new genus *Monopteryx* among *Sophoreæ*, where, however, the two upper lobes are united on the upper side to near the apex. The structure of the ovary and the drupaceous legume place these two genera in the same group as *Andira* and *Geoffroya*. In their foliage, the usual deficiency of the terminal leaflet distinguishes them from all other *Dalbergieæ*, but this character does not appear to be quite constant. Between the two genera the chief differences are in habit, the leaflets being few, large, and coriaceous in *Dipteryx*, more numerous, smaller, and thinner in *Pterodon*; in the consistency of the upper lobes of the calyx—coriaceous in the

former, almost petaloid in the latter; and more especially in the pod, which in *Dipteryx* is a thick (although slightly compressed) drupe, with a tough, filamentous, somewhat fleshy, thick sarcocarp adhering closely to the hard, woody endocarp; whilst in *Pterodon* it is very flat, the sarcocarp very thin, and falls off in two valves, leaving a hard, flat, woody endocarp replete with reservoirs of oil. As, however, none of these differences are structural, but all reducible to degree in consistence and relative thickness, it is not impossible that intermediate species may hereafter be found requiring their reunion into one genus.

I have followed the generality of botanists in considering Aublet's two genera, *Coumarouna* and *Taralea*, as sections only, retaining Schreber's name for the united genus, as it would now be inconvenient to revert to either of Aublet's; although I think that *Coumarouna*, derived from a not uncommon local name of the Tonga bean, would not have been objectionable for the whole of the species. I have not, however, been able to take the opposite or alternate leaves for the sectional character, for that would have separated the *D. nudipes* from the *D. oppositifolia*; but have derived the distinctions rather from the ovary, as being more in accordance with general habit.

I now proceed to the technical synopsis of the genera and species.

Dalbergieæ.

(Tribus Leguminosarum Papilionacearum.)

Caulis lignosus, fruticosus, arboreus v. alte scandens. Folia pinnatim 5–pluri-foliolata (rarissime 3–1-foliolata). Stipellæ nullæ v. rarius parvæ setaceæ. Stamina monadelpha v. varie connata. Legumen indehiscens, mono- v. oligospermum.—Species in regionibus calidioribus utriusque orbis crescentes.

CONSPECTUS GENERUM.

* Pterocarpeæ. *Foliola pleraque alterna* (*excepto* Centrolobio) *rarius solitaria. Legumen membranaceum, coriaceum, lignosum, v. suberoso-incrassatum. Semina sæpius transversa v. hilo laterali affixa.*

1. Dalbergia. Antheræ parvæ, terminales, loculis v. erectis rima brevi terminali dehiscentibus, v. obliquis basi divergentibus, rima longitudinali (in omnibus sequentibus præter *Ecastaphyllum* antheræ versatiles loculis parallelis). Legumen oblongum v. lineare, rarius falcato-abbreviatum, tenue v. ad semen leviter incrassatum.—*Amphigeæ.*

2. Ecastaphyllum. Omnia *Dalbergiæ*, præter legumen brevius, latius, suborbiculare, et demum sæpe suberoso-incrassatum.—*America* et *Africa occidentalis*.

3. Cyclolobium. Calyx basi obtusus. Ovula plurima. Legumen suborbiculare v. late falcatum, tenue. Folia 1-foliolata.—*America*.

4. Machærium. Calyx basi obtusus. Vexillum sæpius sericeum. Ovulum 1 (rarissime 2). Legumen basi monospermum superne in alam attenuatum, venis alæ reticulatis.—*America*.

5. Drepanocarpus. Flos *Machærii*. Legumen reniforme v. circinatum apice vix attenuatum.—*America* et *Africa occidentalis*.

6. Tipuana. Calyx basi acutus v. turbinatus. Petala glabra. Legumen basi seminiferum, apice alatum, venis alæ a stylo divergentibus arcuato-subparallelis.—*America*.

7. Platypodium. Flos *Tipuanæ*. Legumen apice seminiferum basi in alam attenuatum.—*America*.

8. Centrolobium. Calyx amplus. Petala glabra. Legumen basi seminiferum et echinatum, apice alatum, stylo ad basin alæ calcariformi.—*America*.

9. Pterocarpus. Calyx basi acutus v. turbinatus. Petala glabra. Legumen suborbiculare v. late oblongum, medio seminiferum (et sæpe incrassatum), cirumcirca v. fere totum attenuatum.—*Amphigeæ*.

10. Pœcilanthe. Calyx semi-4-fidus, basi acutus. Legumen oblongum, læve.—*America*.

** Lonchocarpeæ. ***Foliola opposita, rarissime hinc inde subalterna, in una specie solitaria. Legumen seriei prioris.***

11. Platymiscium. Folia ipsa opposita. Petala carinalia libera. Ovulum 1. Legumen oblongum planum tenue.—*America*.

12. Hymenolobium. Petala carinalia libera. Ovula plurima. Legumen latum membranaceum.—*America*.

13. Ostryocarpus. Petala carinalia connata. Alæ liberæ. Ovula plurima. Legumen orbiculatum planum coriaceum.—*Africa occidentalis*.

14. Lonchocarpus. Alæ carinæ cohærentes. Ovula plurima. Stamina medio in tubum completum connata. Legumen plano-compressum, sutura vexillari utrinque nervata v. incrassato-dilatata nec dorso unialata.—*America* et *Africa*.

15. Derris. Flos *Lonchocarpi*, stamine vexillari tamen nonnunquam libero. Legumen plano-compressum, sutura vexillari v. utraque unialata.—*America* et *Asia*.

16. Pongamia. Omnia *Lonchocarpi*, excepto legumine breviore crassiore, suturis obtusis.—*Asia*.

17. Piscidia. Omnia *Lonchocarpi*, excepto legumine longitudinaliter late 4-alato.—*America*.

18. Müllera. Omnia *Lonchocarpi*, excepto legumine crasso-carnoso, toruloso, moniliformi v. subgloboso.—*America*.

*** GEOFFROYEÆ. *Foliola alterna v. opposita. Petala carinalia libera v. rarissime subconnata. Legumen* (*excepta* Euchresta) *drupaceum. Semen unicum, pendulum.*

19. EUCHRESTA. Calyx vix dentatus. Vexillum angustum. Petala carinalia connata. Alæ liberæ. Legumen subglobosum, pericarpio tenui. —*Archipelagus indicus.*

20. ANDIRA. Calyx latus truncatus v. breviter dentatus. Drupa globosa, ovoidea v. compressiuscula. Flores paniculati, sæpius violacei, suaveolentes.—*America* et *Africa occidentalis.*

21. GEOFFROYA. Calyx latus, distincte v. profunde dentatus. Drupa *Andiræ.* Flores simpliciter racemosi, sæpius flavi, fœtidi.—*America.*

22. DIPTERYX. Calycis tubus brevissimus, laciniæ 2 summæ maximæ crassiusculæ alæformes, 3 inferiores minimæ v. inconspicuæ. Drupa oblonga, compressiuscula.—*America.*

23. PTERODON. Calyx *Dipterygis* nisi alis membranaceo-petaloideis. Drupa plano-compressa.—*America.*

I. DALBERGIA, *Linn.*

Dalbergiæ sp. et Amerimnum, *DC. Prod.*, Triptolemea, *Mart.*, Miscolobium, *Vog.*, Endespermum, *Blume*, et Podiopetalum, *Hochst.*

Calyx campanulatus, 5-dentatus, dentibus summis latioribus, infimo sæpius productiore. Petala carinalia dorso apice carinata. Stamina 10 monadelpha vagina latere superiore fissa, v. 9 (vexillari deficiente), v. vagina postice fissa in phalanges 2 disposita (isadelpha). Antheræ parvæ, erectæ, didymæ, loculis dorso oppositis apice breviter v. rarius longitudinaliter dehiscentibus. Ovarium stipitatum pauciovulatum. Legumen samaroideum, oblongum v. lineare rarius falcatum, planum, tenue, indehiscens, medio monospermum v. dissite oligospermum, ad semen paullulum induratum et sæpius reticulatum, marginibus nec incrassatis nec alatis. Semen reniforme, plano-compressum, radicula inflexa. Arbores v. frutices scandentes, in regionibus calidis utriusque orbis vigentes. Folia alterna, impari-pinnata, foliolis exstipellatis plerisque alternis. Inflorescentia dichotome cymosa v. irregulariter subcymoso-paniculata, axillaris v. terminalis. Flores parvi, sæpius numerosi, purpurei, violacei, v. albi.

Series 1. TRIPTOLEMEÆ AMERICANÆ. Cymæ 2–3-chotomæ, floribundæ. Flores minimi, vix unquam 2 lineas excedentes, subdioici. Calycis dentes obtusi. Petalorum ungues breves. Stamina 10, monadelpha. Ovarium 1-ovulatum. Legumen rectum, ad semen induratum et reticulato-venosum.

1. D. variabilis. (Brasilia.)
2. D. riparia. (Brasilia sept.)
3. D. brasiliensis. (Brasilia mer.)

Series 2. TRIPTOLEMEÆ GERONTOGEÆ. Omnia ut in Americanis,

floribus tamen omnibus subhermaphroditis et raro 2 lineas æquantibus, vexilli unguis sæpius brevissimus et ovula sæpius 2.

4. D. rimosa. (India sept.)
5. D. Cumingii. (Ins. Philippinæ.)
6. D. emirnensis. (Madagascar.)
7. D. Thomsoni. (India sept.)
8. D. Junghuhnii. (Archipelagus Indicus.)
9. D. parviflora. (Archipelagus Indicus.)
10. D. hostilis. (Africa tropica.)
11. D. carinata. (Africa austr. occid.)
12. D. multijuga. (Africa austr. occid.)
13. D. Milletti. (China austr.)

Series 3. Sissoæ Americanæ. Inflorescentia irregulariter paniculato-ramosa, ramis ultimis subcymosis, rarius ad racemos subsimplices reducta. Flores hermaphroditi (sæpius 3–5 lin., in *D. glaucescenti* et *gracili* minores). Petalorum ungues calyce breviores. Stamina 9 v. 10 monadelpha (rarissime in *D. Spruceana* et *glaucescenti* in phalanges 2 separanda). Legumen mono- v. pleiospermum, ad semina vix induratum et læve v. rarius tenuiter reticulatum.

* *Stamina* 10, *rarius* 9, *calycis laciniæ* 3 *inferiores acutæ.*

14. D. Miscolobium. (Brasilia.)
15. D. Spruceana. (Brasilia bor.)
16. D. calycina. (Guatemala.)
17. D. glandulosa. (Brasilia.)
18. D. acuta. (Brasilia.)
19. D. cuyabensis. (Brasilia.)

** *Stamina* 10. *Calycis laciniæ* 4 *superiores obtusæ.*

20. D. Amerimnum. (America tropica.)
21. D. nigra. (Brasilia.)
22. D. Campeachiana. (America centralis.)
23. D. glaucescens. (Brasilia.)
24. D. lateriflora. (Brasilia.)
25. D. densiflora. (Brasilia.)

*** *Stamina* 9. *Calycis laciniæ* 4 *superiores obtusæ.*

26. D. foliolosa. (Brasilia.)
27. D. villosa. (Brasilia.)
28. D. gracilis. (Brasilia.)

Series 4. Sissoæ Gerontogeæ. Inflorescentia cymosa v. in paniculas minus regulares abiens, rarissime ad racemos subsimplices reducta. Flores hermaphroditi, 2–4 lin. longi. Petalorum ungues calycis dimidium (et interdum calycem totum) superantes. Stamina 9 v. 10, monadelpha.

Legumen 1–3-spermum, ad semina læviusculum v. rarius ut in *Triptolomeis* induratum et corrugatum v. reticulatum.

* *Foliola pauca majuscula. Flores distincte pedicellati.*

29. D. latifolia. (India.)
30. D. Javanica. (Java.)
31. D. cultrata. (Burmah.)
32. D. sissoides. (Peninsula Indica.)
33. D. Championi (D. pseudo-Sissoo?). (Ceylon et Archipelagus Indicus.)

** *Foliola pauca majuscula (sæpe acuminata). Flores subsessiles.*

34. D. Sissoo. (India.)
35. D. obovata. (Africa austr.-occid.)
36. D. ovata. (Burmah.)

*** *Foliola ultra 9 obtusissima v. retusa. Flores subsessiles. Petalorum ungues calycis tubo breviores.*

37. D. foliacea. (Burmah.)
38. D. discolor. (Borneo.)
39. D. confertiflora. (India.)
40. D. sympathetica. (Peninsula Indica.)
41. D. Stocksii. (Peninsula Indica.)

**** *Foliola ultra 7 (excepta* D. rubiginosa) *obtusissima v. retusa. Flores subsessiles (excepta* D. rubiginosa). *Petalorum ungues calycem subæquantes v. superantes.*

42. D. Gardneriana. (Peninsula Indica.)
43. D. velutina. (India or., Burmah.)
44. D. rubiginosa. (Peninsula Indica, China austr.)
45. D. congesta. (Peninsula Indica.)
46. D. densa. (Nova Guinea.)
47. D. Hancei. (China austr.)
48. D. tamarindifolia. (India et Archipelagus.)
49. D. polyphylla. (Ins. Philippinæ.)

Series 5. DALBERGARIÆ GERONTOGEÆ. Inflorescentia et flores *Sissoarum gerontogearum*, exceptis staminibus constanter 10 in phalanges 2 dispositis (isadelphis). Legumen *Sissoarum*.

* *Calycis dentes omnes acuti.*

50. D. paniculata. (India.)
51. D. Assamica. (India sept.)

** *Calycis dentes 2 v. 4 superiores obtusi.*

52. D. lanceolaria. (Peninsula Indica et Ceylon.)
53. D. hircina. (India sept.)
54. D. volubilis. (India.)

55. D. purpurea. (Burmah.)
56. D. saxatilis. (Africa tropica occid.)
57. D. melanoxylon. (Africa tropica.)
58. D. pubescens. (Africa tropica occid.)
59. D. stipulacea. (India sept. et or.)
60. D. Luzoniensis. (Ins. Philippinæ.)
61. D. flexuosa. (India sept.)

Series 6. SELENOLOBIA. Legumen breve, monospermum, falcatum v. lunato-subreniforme crassiusculum. Cætera *Sissoarum*.

* *Gerontogeæ.*

62. D. monosperma. (Ceylon, India, China austr., Malacca.)
63. D. spinosa. (India.)

** *Americanæ.*

64. D. inundata. (Brasilia bor.)

Series 1. *Triptolemeæ Americanæ* (*subdioicæ*).

1. D. VARIABILIS (*Vog. Linnæa*, xi. p. 196), subscandens, glabra v. pubescens, foliolis 5–13 ovatis oblongisve obtusis v. acutiusculis, cymis dichotomis folio brevioribus v. summis paniculatis, floribus parvis subdioicis, leguminis stipite calyce longiore.—*Triptolemea platycarpa, T. ovata, T. pauciflora, T. montana, T. latifolia*, et *T. glabra*, Benth. in Ann. Mus. Vind. ii. pp. 102 et 103.—*Pterocarpus frutescens*, Vell. Fl. Flum. vii. t. 96.—Foliola 1–1½ v. rarius 2-pollicaria, forma valde variabilia, supra insigniter venulosa, subtus plus minus pubescentia, rarius omnino glabra. Flores in cyma numerosissimi, 2–2½ lin. longi, albidi. Ovula in masculis sæpius omnino desunt, rarius minutissima et abortientia. Legumen 1½ poll. longum, 5–9 lin. latum, medio ad semen insigniter reticulatum.

Hab. Tropical America; widely spread in southern and central Brazil, where it is said to form a small tree in open hot situations, and a woody climber in woods (*Vauthier*, n. 78, 132, & 180, Blanchet 2840, 3426, 3674, 3675, and 3784, *Mart. Hb. Fl. Bras.* n. 175, &c.), also in Eastern Peru, near Tarapoto, *Spruce*, n. 4517, and in South-western Guiana, *Schomburgk*, 1st coll. n. 801.

β, *tomentosa*, pube evidentiore, foliolis sæpius quam in formis glabris numerosioribus.—*Triptolemea myriantha*, Bth. in Ann. Mus. Vind. ii. p. 102.—*T. pubescens*, Benth. in Hook. Journ. Bot. ii. p. 68.—*Dalbergia tomentosa*, Vog. Linnæa, xi. p. 197.

Hab. Brazil, prov. Minas Geraes, Ceara, et Piauhy (*Gardner*, n. 1537 et 2553; *Mart. Hb. Fl. Bras.* n. 1309).

2. D. RIPARIA (*Benth. in Mart. Fl. Bras. Leg. ined.*), fruticosa, subarborescens, pubescens, foliolis 5–9 ovali-oblongis acuminatis, cymis dichotomis folio brevioribus v. summis paniculatis, floribus parvis subdioicis, legumine (ovali-oblongo?) subsessili.—*Triptolemea*

riparia, Mart., Benth. in Ann. Mus. Vind. ii. p. 103. Affinis *D. variabili*, foliola vulgo majora (2–4-pollicaria), cymæ densiores, flores numerosiores minoresque, vix unquam 2 lin. longi. Ovarium brevius stipitatum et stipes post anthesin haud increscere videtur. Legumen tamen perfectum non vidi.

Hab. North Brazil (*Schomburgk*, 1st coll. n. 907, etc.).

3. D. BRASILIENSIS (*Vog. Linnæa*, xi. p. 198), pubescens, foliolis 21–25 lineari-oblongis, cymis (dichotomis?) tomentosis floribus parvis (subdioicis?).

Hab. South Brazil (*Sello*).

I have not seen these specimens, which are said to differ from *D. variabilis* chiefly in their numerous narrow leaflets. I saw, however, in the Paris Herbarium a plant from S. Paolo and Minas Geraes, with leaflets 1–1¼ inch long, and 3–5 lines broad, which I had not leisure to examine, but which was probably referrible to the species.

Series 2. *Triptolemeæ gerontogeæ* (*hermaphroditæ*).

4. D. RIMOSA (*Roxb. Fl. Ind.* iii. p. 233), fruticosa, foliolis 5–9 ovali-ellipticis obtusis mucronatisve crebre subparallele venulosis subtus inflorescentiaque puberulis, cymis dichotomis floribundis, floribus minimis subsessilibus, calycis laciniis obtusis tubo brevioribus, petalorum unguibus brevissimis, ovario glabro, stylo brevi.—Wight, Ic. t. 262.—Habitu et floribus *D. variabili* similis, sed etiam in floribus sterilibus ovula semper adesse videntur. Foliola 2–2½-pollicaria, rarius minora in ramis sterilibus nonnunquam duplo majora, subcoriacea, insigniter venulosa, supra glabra. Cymæ corymboso-paniculatæ v. inferiores axillares. Flores 1–1¼ rarius fere 1½ lin. longi. Stamina 10. Ovarium breve stipitatum, 1–2-ovulatum. Legumen 2–3-pollicare, monospermum, 1 poll. latum, apice rotundatum, ad semen valde reticulatum, rarissime 2-spermum vidi, 4-pollicare.

Hab. Northern India, Silhet and Khasiya, *Roxburgh*, *Wall. Cat.* n. 5853, *Hooker* and *Thomson*; Assam, *Jenkins*; Sikkim Terai, *J. D. Hooker*.

5. D. CUMINGII (*Benth. in Pl. Jungh.* v. i. p. 255, in adnot.), fruticosa? foliolis 5–9 ovalibus obtusis emarginatis crebre reticulato-venulosis subtus inflorescentiaque puberulis, cymis dichotomis floribundis, floribus minimis subsessilibus, calycis laciniis obtusis tubo sublongioribus, petalorum unguibus brevissimis, ovario subglabro, stylo brevi. —*D. rimosæ* similis. Foliola minora (1–1½-pollicaria), venis magis reticulatis, primariis a costa divergentibus utrinsecus 6–10 seu ultra 30, flores adhuc minores (vix lineam longi), calycibus profundius fissis. Stamina 10. Legumen non visum.

Hab. Philippine Islands, *Cuming*, n. 1244.

This may ultimately prove to be only a variety of *D. rimosa*.

β, *Zollingeriana*, ramulis, petiolis inflorescentiaque pubescenti-hirtis.—*D. Zollingeriana*, Miq. Fl. Ned. Ind. v. i. p. 130.

Hab. Java, *Zollinger*. n. 3041.

6. D. EMIRNENSIS, sp. n., arborea, foliolis 7–11 ovatis ellipticisve subtus petiolisque ferrugineo-pubescentibus, cymis dichotomis floribundis subterminalibus, floribus minimis subsessilibus, calycis laciniis obtusis tubo brevioribus, petalis sessilibus, ovario pilosulo, stylo brevissimo.—Foliola subpollicaria venulosa. Flores linea breviores. Calycis laciniæ maximæ alte coalitæ, omnes ovatæ. Petala calycem breviter superantia. Stamina 10. Legumen non visum.

Hab. Madagascar, near Ramassina, prov. Emirna, *Bojer*.

Very near *D. rimosa*, but with very much smaller flowers, and smaller leaves.

7? D. THOMSONI, sp. n., glabra, foliolis 9–11 obovali-oblongis obtusis retusisve glabris subtus pallidis tenuiter venulosis, cymis dichotomis floribundis glabris, floribus minimis breviter pedicellatis, calycis laciniis obtusis tubo brevioribus, petalis subsessilibus, ovario pilosulo, stylo brevi, legumine apice contracto ad semen leviter venoso.—Affinis *D. Junghuhnii*. Foliola pauciora, majora pollicaria v. paullo longiora. Pedicelli evidentiores, raro tamen lineam longi. Flores 1¼ lin. Calycis dentes omnes lati et obtusi, laterales minores, infimus sublongior. Petala calyce paullo longiora. Stamina 9 in phalanges 2 disposita. Ovula 2. Legumen acinaciforme, bipollicare, medio 9 lin. latum, margine carinali valde arcuato.

Hab. Upper Assam, *Griffith*; Khasiya, *Hooker & Thomson*.

8. D. JUNGHUHNII (*Benth. in Pl. Jungh.*, i. p. 254), foliolis 11–15 elliptico-oblongis obtusis glabris v. subtus petioloque puberulis tenuiter venosis, cymis dichotomis floribundis tomentoso-pubescentibus, floribus minimis breviter pedicellatis, calycis laciniis obtusiusculis tubo æquilongis, petalis subsessilibus, ovario glabro, stylo brevi.—Foliola 6–9 lin. longa, 3–4 lin. lata. Flores 1¼ lin. longi. Stamina 9 (v. 10?), monadelpha. Legumen non visum.

Hab. Sumatra, *Junghuhn*; Malacca, *Griffith*.

9? D. PARVIFLORA (*Roxb. Fl. Ind.*, iii. p. 225), foliolis 7–9 lato-lanceolatis glabris, paniculis (cymis?) terminalibus corymbiformibus, bracteis rotundatis ciliatis, floribus minimis, staminibus monadelphis, legumine falcato 1–2-spermo. Cætera ignota.

Hab. Moluccas, *Roxburgh*.

I have seen no specimen. From Roxburgh's very short character, it is probably near the *D. Junghuhnii*. Should it prove identical, Roxburgh's name has the preference.

10. D. HOSTILIS, sp. n., spinis axillaribus, foliolis 15–19 elliptico-oblongis obtusis glabris v. subtus petiolisque pilosulis tenuissime venulosis, cymis dichotomis tomentoso-pubescentibus floribundis, floribus minimis subsessilibus, calycis laciniis obtusis tubo brevioribus, petalis subsessilibus, ovario glabro, stylo brevissimo.—*D. Junghuhnii* valde affinis. Differt axillis spina semipollicari (pedunculo abortivo?) armatis, foliolis numerosioribus ½–1 poll. longis (maxima cujusve folii

raro 15–16 lin. longa), venis tenuioribus. Flores $1\frac{1}{2}$ lin. longi. Calycis dentes 4 ovati obtusi, infimus lanceolatus paullo longior. Vexillum obovatum, calyce duplo longius. Stamina 9, monadelpha. Legumen non visum.

Hab. Tropical Africa at Abeakouta in Guinea, *Irving.*

11. D. ARMATA (*E. Mey. Comm. Pl. Afr. Austr.* p. 152), foliolis 13–25 parvis anguste oblongis obtusis glabris subtus discoloribus, cymis confertis dichotomis floribundis rufo-tomentellis, floribus parvis breviter pedicellatis, calycis dentibus 4 summis obtusis, petalis breviter unguiculatis, ovario puberulo, stylo brevissimo.—*D. myriantha,* Meisn. in Lond. Journ. Bot. ii. p. 100.—Frutex ramosissimus, subscandens, inflorescentia excepta glaber, ramulis hinc inde semiabortivis spinescentibus. Foliola conferta, 3–4 lin. longa. Flores fere 2 lin. longi. Ungues petalorum minus abbreviati quam in speciebus præcedentibus et stamina fere isadelpha, et species inter *Triptolemeis* et *Sissois* subintermedia, inflorescentia priorum. Legumen 1–2 poll. longum, 4–6 lin. latum, 1–2-spermum, glaberrimum, ad semina paullo incrassatum et tenuissime reticulatum.

Hab. South Africa, near Port Natal, *Drège, Krauss,* n. 220, *Peddie, Plant, Gueinzius,* etc.

12. D. MULTIJUGA (*E. Mey. Comm. Pl. Afr. Austr.* p. 153), foliolis 21–33 oblongis obtusis mucronulatis subtus petiolis ramulisque ferrugineo-pubescentibus, cymis brevibus (floribus subsessilibus ?), legumine ferrugineo-pubescente.—Foliola conferta, subsemipollicaria, supra parce pilosula. Flores ignoti. Legumen longe stipitatum, monospermum, 2-pollicare, medio 8–9 lin. latum, apice basique angustatum, ad semen ut in *Triptolemeis* veris insigniter reticulatum.

Hab. South Africa, near Morley, *Drège.*

13. D. MILLETTI, sp. n., scandens, foliolis 25–35 parvis lineari-oblongis obtusis retusisve glabris, cymis axillaribus brevibus glabris v. minute puberulis, floribus parvis subsessilibus, calycis dentibus obtusis, petalis brevissime unguiculatis, ovario pilosulo, stylo breviter subulato. —*D. polyphylla,* Benth. Pl. Jungh. i. p. 256, in adnot. quoad plantam Chinensem.—Tota glabra v. pubes minuta ad petiolos et inflorescentiam. Foliola 4–6 lin. longa. Cymæ graciles, folio multo breviores. Flores vix 2 lin. longi. Vexillum subsessile. Ovula 3. Legumen monospermum, $1\frac{1}{2}$–2 poll. longum, 7–8 lin. latum, ad semen induratum et rugosum.

Hab. South China, *Millett* ; frequent in Hong-Kong, *Champion, Hance, Wright, Wilford.*

Having formerly seen it in fruit only, I had confounded it with the *D. polyphylla* from the Philippines, which I had seen in flower only, and which it much resembles in foliage ; but now that I have numerous specimens in good flower, it proves to be quite distinct. An indifferent specimen from Borneo, *Motley,* appears to be the same species.

Series 3. *Sissoæ Americanæ* seu *Miscolobia.*

[The difference, especially in inflorescence, between the American *Sissoos* and *Triptolemeas* is much more marked than in the Asiatic and African ones.]

14. D. MISCOLOBIUM (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 11–21 ovatis oblongisve coriaceis subaveniis glabris, calycis laciniis inferioribus acutis, staminibus 10, vexillari libero, ovario biovulato.—*Miscolobium violaceum,* Vog. Linnæa, xi. p. 201; Benth. in Ann. Mus. Vind. ii. p. 103, excl. syn. Vell. *M. nigrum,* Mart. Herb. Fl. Bras. n. 1126.—Arbor. Specimina siccitate nigricant. Foliola obtusa v. retusa, nunc ovata pollicaria et longiora, nunc oblonga et dimidio minora. Paniculæ folio breviores, fusco-pubescentes. Flores 4–5 lin. longi, pedicello 1–1¼ lin. longo. Petala longiuscule unguiculata. Legumen vulgo monospermum, 1½–2 poll. longum, 7–8 lin. latum, glabrum.
Hab. Brasil, prov. San Paolo, Minas Geraes, Bahia, and Piauhy (*Gardner,* n. 2459; *Blanchet,* n. 2874).

15. D. SPRUCEANA (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 7–11 ovatis oblongisve coriaceis tenuiter venulosis glabris, calycis laciniis inferioribus acutis, staminibus 10, vexillari subsoluto, ovario 10–12-ovulato.—*Miscolobium Spruceanum,* Benth. Pl. Spruce exs.—Arbor. Specimina ut in *D. miscolobio* siccitate nigricant, et inflorescentia pariter fusco pubescens. Foliola paullo majora, 1–2-pollicaria. Flores majores. Staminum tubus postice fissus ut in *Dalbergiariis.* Ovulis numerosis ab omnibus differt. Legumen nunc monospermum et 2-pollicare, nunc 3–4-spermum, usque ad 4 poll. longum, 6–7 lin. latum.
Hab. North Brasil, *Spruce.*

16. D. CALYCINA, sp. n., foliolis 5–7 longe petiolulatis ovato-oblongis acuminatis coriaceis basi angustatis glabris, racemis subsimplicibus, calycis pedicellati basi longe attenuati laciniis inferioribus acutis, staminibus 9 (v. 10?) monadelphis, ovario glabro 4–6-ovulato.—Ramuli et folia glabra. Foliola 1½–2-pollicaria, petiolulo 2–3 lin. longo, per anthesin vix evoluta, demum ut videtur coriacea. Racemi ad bases innovationum 1–2-pollicares, laxiflori, uti calyces tomento brevi rufescentes. Pedicelli 2 lin. longi. Calyx rufo-pubescens, fere 4 lin. longus, laciniis summis alte connatis obtusiusculis. Vexillum 6 lin. longum, ungue brevi. Antheræ generis. Legumen junius vidi bispermum, maturum deest.
Hab. Guatemala, *Friedrichsthal.*

17. D. GLANDULOSA (*Benth. in Mart. Fl. Bras. Leg.* ined.), ramulis inflorescentiaque glanduloso-pubescentibus, foliolis 21–29 oblongo- v. lanceolato-ovatis acutis rigidis utrinque pubescentibus, calycis laciniis omnibus acutis, staminibus 10 monadelphis.—Foliola majora pollicem longa, 5 lin. lata, superiora decrescentia et angustiora, omnia rigidula.

Panicula terminalis laxa, ramulis irregulariter paniculato-ramosis. Flores subsessiles, circa 3 lin. longi. Legumen viscoso-pubescens, 6 lin. latum.

Hab. Brasil, prov. Minas Geraes.

18. D. ACUTA (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 15–25 lanceolatis v. ovato-lanceolatis margine revolutis utrinque ramulis inflorescentiaque molliter villosis, calycis laciniis omnibus acutis, staminibus 10 monadelphis.—Foliola 6–9 lin. longa. Flores in paniculis brevibus conferti, 4 lin. longi. Ovarium villosissimum, ovulis 4.

Hab. Brazil, prov. Minas Geraes.

19. D. CUJABENSIS (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 15–21 oblongis obtusis utrinque ramulis inflorescentiaque molliter velutino-pubescentibus, calycis laciniis 3 inferioribus acutis, staminibus 10 monadelphis. Foliola fere pollicaria v. foliorum superiorum semi-pollicaria. Flores subsessiles, 3 lin. longi. Ovarium villosissimum, ovulis circa 3. Legumen 1–1½ poll. longum, 6 lin. latum, molliter pubescens.

Hab. Brasil, prov. Mattogrosso.

20. D. AMERIMNUM, foliolis solitariis ovatis acuminatis subcordatis glabris v. subtus tenuiter puberulis, racemis brevibus axillaribus laxis subpaniculatis, calycis pedicellati dentibus obtusis, staminibus 10 monadelphis.—*Amerimnum Brownei*, Sw. Fl. Ind. Occid. p. 1234. *Amerimnum strigulosum*, H. B. et K. Nov. Gen. et Sp. vi. p. 389? —Arbor partibus novellis puberulis. Folia adulta sæpius glabra. Foliolum 2–3-pollicare, demum subcoriaceum. Pedicelli 1–2 lin. longi. Flores albi, circa 4 lin. longi. Ovarium stipitatum, pilosulum, ovulis 4–5. Stylus subulatus. Legumen nunc monospermum, 6–9 lin. longum, nunc 3–4-spermum, 1½–2-pollicare, circa 5 lin. latum, glabrum, venulosum v. demum leviter incrassatum et læve.

Hab. Tropical America, Jamaica, St. Domingo, and other West Indian islands; in Central America, *Sinclair*, *Cuming*, n. 1318, *Oersted*; Tumaco in Columbia, *Hinds*; Cumana, *Funcke*, n. 583; Maracaybo, *Moritz*. 1266, and on the Orinoco if the synonym of *A. strigulosum* be correct.

21. D. NIGRA (*Allem., Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 17–25 oblongis obtusis retusisve subtus pilosulis, ramulis inflorescentiaque minute tomentellis, racemis brevibus laxis subramosis, calycis pedicellati laciniis superioribus obtusis infima productiore, staminibus 10 monadelphis.—*Pterocarpus niger*, Vell. Fl. Flum. vii. t. 91. *Miscolobium nigrum*, Allem. Trab. Soc. Vell. p. 66, non Mart. et excl. syn. Vog.—Arbor. Foliola in speciminibus florentibus vix perfecte evoluta 4–5 lin. longa. Inflorescentia et flores omnino *D. Amerimni*. Ovula tamen duo tantum in ovario.

Hab. Brazil, prov. Minas Geraes (and Rio Janeiro?).

This, according to Allemão (whose specimens have been kindly lent to

me by Mr. Miers), is the tree which supplies the greater part of the *bois de Palissandre* or *Rose-wood* for the European market.

22. D. CAMPECHIANA, foliolis 7–19 oblongis obtusissimis retusisve subtus ramulis inflorescentiaque tenuiter pubescentibus glabratisve, paniculis brevibus subcymosis, calycis pedicellati dentibus obtusis, staminibus 10 monadelphis.—*Robinia glabra*, Mill., D.C. Prod. ii. p. 262.—Arbor. Foliola pollicaria v. minora, more *D. variabilis* supra venulosa, at semper obtusissima v. emarginata. Paniculæ sessiles v. breviter pedunculatæ, densifloræ. Flores fere *D. Amerimni*, at minores. Ovarium semper 3-ovulatum vidi. Legumen glabrum, monospermum 1¼ poll., 2–3-spermum 2–3 poll. longum, 5–6 lin. latum, ad semina leviter induratum, basi in stipitem brevem angustatum.

Hab. Central America, forests of Campeachy in Yucatan, *Herb. Banks, Linden*, n. 1329, *Johnson*, n. 27, South Mexico, *Jurgensen*, n. 226.

23. D. GLAUCESCENS (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 11–19 ovali-oblongis obtusis retusis v. vix mucronatis novellis sericeis demum glabratis, racemis ramosis confertifloris summis paniculatis, floribus parvis brevissime pedicellatis, calycis laciniis superioribus obtusis infima productiore, staminibus 10 subisadelphis.—*Miscolobium glaucescens*, Mart.; Benth. in Ann. Mus. Vind. ii. p. 103.—Scandens? Foliola majora pollicaria, rarius dimidio minora. Flores vix 2½ lin. longi, violacei. Stamina in floribus examinatis in phalanges 2 disposita, nunc $\frac{5}{5}$, nunc $\frac{6}{4}$. Legumen sesquipollicare, junius pubescens subglandulosum, demum glabrum.

Hab. Brasil, prov. Minas Geraes and Bahia (*Blanchet*, n. 3867).

24. D. LATERIFLORA (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 15–21 oblongis obtusis subtus sericeo-pubescentibus, racemis brevibus confertis subpaniculatis, calycis brevissime pedicellati laciniis omnibus obtusis vix inæqualibus, staminibus 10 monadelphis v. vexillari subsoluto.—*D. nigræ* affinis, differt indumento, pedicellis abbreviatis, floribus paullo minoribus, calycis dente infimo vix productiore. Ovula 3–4. Legumen non visum.

Hab. Brasil, prov. Minas Geraes.

25. D. DENSIFLORA (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 15–27 ovali-oblongis mucronulatis subtus ramulis inflorescentiaque pubescenti-villosis, paniculis densis fasciculato-ramosis, calycis laciniis omnibus ovatis vix inæqualibus, staminibus 10 monadelphis.—*Miscolobium densiflorum* et *M. divaricatum*, Benth. in Ann. Mus. Vind. ii. p. 104.—Foliola pleraque 7–9 lin. longa, circa 4 lin. lata, rarius subpollicaria. Cymæ fasciculiformes, densæ, secus ramos paniculæ confertæ. Flores subsessiles, 3 lin. longi. Calyx dense villosus. Ovarium villosum, ovulis 3. Legumen non visum.

Hab. Brasil, prov. Goyaz.

26. D. FOLIOLOSA (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 13–21 elliptico-oblongis obtusis v. rarius mucronulatis subtus pallidis

junioribus ramulis inflorescentiaque pubescentibus, paniculæ ramis brevibus laxiusculis, calyce villoso, staminibus 9 monadelphis.—*Miscolobium polyphyllum*, Benth. in Ann. Mus. Vind. ii. p. 103.—Arbor parva. Foliola ¾–1-pollicaria v. rarius 1¼ poll. longa. Paniculæ folio breviores. Pedicelli brevissimi. Flores circa 4 lin. Ovula 2–3. Legumen 1–1½-poll. longum, 5–7 lin. latum, monospermum, tenue, nec ad semen induratum.

Hab. Brasil, prov. Rio Janeiro and Minas Geraes.

27. D. VILLOSA (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 15–27 ovali-ellipticis oblongisve obtusis retusisve rarius mucronulatis subtus ramulis inflorescentiaque villosis, paniculis densis fasciculato-ramosis, calycibus villosis, staminibus 9 monadelphis.—*Miscolobium villosum*, Benth. in Ann. Mus. Vind. ii. p. 104.—*D. densifloræ* valde affinis. Foliola obtusiora. Flores paullo minores et stamen vexillare constanter deesse videtur. Legumen non visum.

Hab. Brasil, prov. Minas Geraes.

28. D. GRACILIS (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 15–27 anguste oblongis obtusis subtus vix pilosulis, ramulis inflorescentiaque minute tomentellis, panicula terminali floribunda ramis elongatis, floribus parvis, calyce glabro, staminibus 9 monadelphis.—Arbor ramis gracilibus subscandentibus. Foliola 4–6 lin. longa. Flores circa 2 lin. longi. Ovarium glabrum v. basi pilosulum, ovulis 2. Legumen junius longe stipitatum, monospermum.

Hab. Brasil, prov. Mattogrosso.

Series 4. *Sissoæ Gerontogeæ.*

29. D. LATIFOLIA (*Roxb. Pl. Corom.* ii. p. 7. t. 113), glabra, foliolis 3–7 longe petiolulatis orbiculatis v. latissime obovatis obtusissimis retusisve, paniculis lateralibus subpaniculatis laxis, calycis pedicellati glabri laciniis obtusiusculis, petalis longiuscule unguiculatis, staminibus 9 monadelphis, stylo subulato.—Wight, Ic. iii. t. 1156. *D. emarginata*, Roxb. Fl. Ind. iii. p. 224.—Foliola sæpius 5 v. 6, alterne dissita, 1½-pollicaria, ad petiolulum 3–4 lin. longum breviter acutata. Paniculæ graciles, infrafoliaceæ v. rarius axillares, folio breviores. Flores 2½ v. fere 3 lin. longi, pedicelli 1–1½ lin. Bracteolæ membranaceæ, longe ante anthesin caducæ. Petalorum ungues tubum calycis subæquantes. Ovarium glabrum, ovulis sæpius 3. Legumen monospermum 1½-pollicare, 3-spermum 3-pollicare, circa 6 lin. latum, vix tenuissime reticulatum.

Hab. East Indian Peninsula and Central India from Bombay (*Jacquemont*, etc.) to Bundelkund, *Edgeworth*; and Behar, *J. D. Hooker*; also in Sikkim, *J. D. Hooker*; and in the Andaman Islands, *Roxburgh*.

30. D. JAVANICA (*Miq. Fl. Ned. Ind.* i. p. 132), glabra, foliolis circa 7 longe petiolulatis late obovatis brevissime acuminatis, panicula terminali laxe subcymosa foliis breviore, calycis pedicellati glabri

laciniis obtusiusculis.—*D. latifoliæ* valde affinis, differre videtur imprimis foliolis breviter acuminatis nec retusis et inflorescentia. Specimen tamen unicum floribus apertis caret. Foliola 1¼-pollicaria, petiolulo 4–5-lineari. Pedicelli 1 lin. longi. Calyx omnino *D. latifolii*.
Hab. Java, *Horsfield*.

31. D. CULTRATA (*Grah. in Wall. Catal.* n. 5861), glabra, foliolis 7–11 obovali-ellipticis obtusissimis retusisve, paniculis lateralibus subfasciculatis laxis brevibus, calycis pedicellati glabri laciniis acutis, staminibus 9 monadelphis, stylo subulato.—Foliola pleraque 1½-pollicaria v. paullo longiora, fere pollicem lata, ad petiolulum vix 2 lin. longum minus acutata quam in *D. latifolia*, venulis crebrioribus tenuioribus. Inflorescentia *D. latifoliæ*; flores paullo minores, pedicello sublongiore. Petalorum ungues calycis tubo paullo breviores. Ovarium glaberrimum, ovulis 3. Legumen monospermum 1¼-poll., 3-spermum 4 poll. longum, 6–7 lin. latum, ad semina vix induratum.
Hab. Burma. Prome and Trogla Hills, *Wallich*, n. 5861 & 5847 B; Rangoon, *MacClelland*.

32. D. SISSOIDES (*Grah. in Wall. Catal.* n. 5876), glabra, foliolis 5–7 ovali-ellipticis obtusis v. acutiusculis, paniculis laxis terminalibus foliatis v. axillaribus, calycis pedicellati laciniis omnibus obtusis, petalis longiuscule unguiculatis, staminibus 9 monadelphis, stylo subulato.—*D. latifoliæ* valde affinis, differt imprimis foliolis angustioribus brevius petiolatis et inflorescentia. Foliola sæpius 1½-pollicaria raro pollicem lata. Flores quam in *D. latifolia* paullo majores, calycis laciniis obtusioribus. Ovarium glabrum, ovulis 4. Legumen non visum.
Hab. Nilgherry Hills, *Noton*.

Like the *D. javanica*, this species requires further comparison with the *D. latifolia* when more complete specimens shall have been obtained.

33. D. CHAMPIONI (*Thwaites, Enum. Pl. Ceyl.* p. 95), scandens, glabriuscula, foliolis 2–5 ovatis acuminatis coriaceis nitidis, paniculis laxis folia subæquantibus, calycis pedicellati vix puberuli dentibus æquilongis obtusis v. infimo acutiusculo, petalis longiuscule unguiculatis, staminibus 9 monadelphis, stylo subulato.—Foliola maxina 3–4 poll. longa, 2–2½ poll. lata, acumine abrupte obtuso, interdum 2 poll. longa et vix 1 poll. lata, utrinque glabra et concoloria, v. juniora minute puberula. Paniculæ irregulariter subcymosæ. Pedicelli 1–1¼ lin. longi. Flores circa 3 lin. v. paullo longiores. Calyx ovato-campanulatus, rubens. Petalorum ungues calyce paullo breviores. Ovarium puberulum. Ovulum constanter unicum vidi, dum in cæteris *Sissois Gerontogeis* 3–4 v. in paucis speciebus 2 inveni. Legumen breviter stipitatum, 3–4 poll. longum, circa 9 lin. latum, medio ad semen corrugatum.
Hab. Ceylon, *Thwaites*, n. 761 & 772; *Gardner*, n. 245; *Walker*, *Champion*; Borneo, *Motley*, n. 213.

D. pseudo-Sissoo, Miq. Fl. Ned. Ind. i. p. 128, appears from his description to be the same plant as the *D. Championi*; and if so, his name, however unfortunately selected, should be adopted as having the right of priority. I have not, however, ventured to do so without seeing his specimens, as he does not mention the number of ovules in the ovary.
Hab. Java and Borneo.

34. D. Sissoo (*Roxb. Fl. Ind.* iii. p. 223), arborea, pubescens v. demum glabrescens, foliolis 3–5 orbiculato-subrhombeis acuminatis, paniculis brevibus axillaribus subcymosis puberulis, calycis subsessilis angusti dentibus summis obtusis, petalis longiuscule unguiculatis, staminibus 9 monadelphis, stylo brevissimo.—*D. pendula*, Ten. Cat. Hort. Neap. p. 84.—Foliolum terminale sæpius bipollicare, lateralia minora, dissite alterna, rhachi flexuosa, utrinque concoloria, novella molliter pubescentia, mox glabrata. Cymæ simplices et paucifloræ v. in paniculas parvas folio semper breviores dispositæ. Flores circa 4 lin. longi. Calycis dentes breves lati, ciliati, 2 summi coaliti. Petalorum ungues calycis tubum subæquantes. Ovarium pilosulum, ovulis 2–4. Legumen monospermum 1½–2-pollicare, 3-spermum 3–3½-pollicare, 4–5 lin. latum, basi in stipitem longe angustatum, læve v. vix reticulatum.
Hab. East India, from the Peninsula, Beloochistan, *Stocks*, n. 425, and Affghanistan, *Griffith*, n. 1183, to the Himalayas, where it is common in river-beds (*Edgeworth, Jacquemont, Winterbottom*, &c.), and Sikkim, *J. D. Hooker*; abundant in the plains of Central India.

35. D. obovata (*E. Mey. Comm. Pl. Afr. austr.* p. 152), foliolis 5–7 obovatis oblongisve obtusis (rarius acutiusculis?) rigidulis reticulato-venosis glabriusculis, cymis confertis paniculatis ferrugineo-tomentosis ultimis subcapitatis, calycibus sessilibus angustis dentibus obtusissimis, petalorum unguibus tubo brevioribus, staminibus 10 monadelphis, stylo breviter subulato.—*Podiopetalum reticulatum*, Hochst. Flora, 1841, p. 658.—Frutex ramulis novellis petiolis paniculisque ferrugineo-tomentosis. Folia adulta glabrescentia. Foliola 1–1 v. raro 2 poll. longa, 6–9 lin. lata, pleraque obtusissima, insigniter venosa. Inflorescentia fere *D. confertifloræ*. Flores quam in *D. Sissoo* minores, vix 3 lin. longi. Calyx subtubulosus. Vexillum ovatum. Ovarium longe stipitatum, villosulum, ovulis circa 4. Legumen monospermum, stipitatum, 1–2 poll. lougum, apice basique acutatum, medio 6 lin. latum, ad semen magnum ut in *Triptolemeis* insigniter reticulatum.
Hab. South Africa, near Port Natal, *Drège*; *Krauss*, n. 193.

This is one of the species that connect the *Sissoos* with the *Triptolemeas*.

36. D. ovata (*Grah. in Wall. Catal.* n. 5854), glabra, foliolis 5–7 ovatis obtuse acuminatis subcoriaceis, paniculis laxiusculis folio paullo brevioribus, calycis brevissime pedicellati ovati dentibus omnibus obtusis, petalis longiuscule unguiculatis, staminibus 9 monadelphis,

stylo subulato.—*D. glauca*, Wall. Catal. n. 5862.—Arbor? Foliola fere *D. Championi*, 2–3 poll. longa, 1½–2 poll. lata, longiuscule petiolulata. Panicula terminalis, lata, laxe corymbosa. Flores vix 3 lin. longi. Calyx glaberrimus, dente infimo cæteris latiore nec more solito angustiore. Petalorum ungues calyce paullo breviores. Alæ et carina hinc calcarato-auriculatæ. Ovarium glaberrimum, ovulis 4. Legumen subglaucescens monospermum subbipollicare, 3-spermum 4-pollicare, 6–7 lin. latum, ad semen tenuiter reticulatum.

Hab. Moolmyne, *Wallich, Lobb.*

37. D. FOLIACEA (*Wall. Catal.* n. 5856 litt. A, C et D), arborea, foliolis 9–13 elliptico-oblongis obtusis retusis v. breviter acuminatis glabris v. subtus inflorescentiaque pubescentibus, panicula terminali late cymosa, calycibus subsessilibus latis dentibus superioribus obtusis, petalis longiuscule unguiculatis, staminibus 9 monadelphis, stylo breviter subulato.—*D. ovatæ* affinis, imprimis foliis diversa. Foliola variant 2 poll. longa et ¾ poll. lata usque ad 4 poll. longa et 1¼ poll. lata, apice omnia obtusa v. retusa, v. nonnulla breviter et obtuse acuminata; petiolulus brevis; costa subtus valde prominens venis primariis tenuibus distantibus. Flores 2 lin. v. paullo majores. Petalorum ungues calycis tubo paullo breviores. Ovarium glabrum v. pilosulum, ovulis 2. Legumen fere *D. rimosæ* sed longius, usque ad 4 poll. longum et fere 1 poll. latum, medio ad semen magnum insigniter reticulatum.

Hab. Moolmyne et Prome, *Wallich*; Rangoon, *MacClelland.*

This is another of the species which nearly connects the *Sissoos* with the *Triptolemeas*, having the pod of the latter, with the flowers of the former.

38? D. DISCOLOR (*Miq. Fl. Ned. Ind.* i. p. 130), foliolis circa 16, late v. obovato-ellipticis vulgo emarginatis supra puberulis nitidis subtus discoloribus pubescentibus, cymis axillaribus terminalibusque corymboso-confertis, floribus subsessilibus.—Foliola vulgo 1¾ poll. æquantia, coriaceo-membranacea, venis teneris at distinctis. Legumen stipitatum, monospermum, fere 2-pollicare, 5–6 lin. latum, raro dispermum angustius et longius.

Hab. Borneo, south coast.

This species is unknown to me, and has only been seen by Miquel in fruit. From his incomplete description it would appear to be allied to the *D. foliacea*.

39. D. CONFERTIFLORA (*Benth. in Pl. Jungh.* i. p. 255 in adnot.), scandens, foliolis 11–15 oblongis obtusis retusisve glabris venis tenuibus, panicula pyramidata tomentosa cymis ultimis subcapitatis, calycis sessilis dentibus obtusis, vexilli ungue calycis tubo breviore, ovario hirsuto, stylo breviter subulato, staminibus 9 monadelphis.—A *D. sympathetica* differt foliolis majoribus, a *D. volubili* staminum tubo postice integro. Foliola 1–1½-pollicaria breviter petiolulata venis vix conspi-

cuis. Cymæ numerosæ in paniculam amplam subaphyllam dispositæ. Flores circa 2¼ lin. longi. Petalorum ungues calycis tubo paullo breviores. Ovarium hirsutum, ovulis 3–4. Legumen non visum.

Hab. East India, Sillet and Oude, *Wallich, Catal.* n. 5848 E & I, mixed, however, with the *D. monosperma*; Concan, *Stocks.*

40. D. SYMPATHETICA (*Nimmo, Benth. in Pl. Jungh.* p. 255 in adnot.), scandens, foliolis 11–15 obovali-oblongis obtusissimis emarginatis crebre venulosis junioribus utrinque ramulisque pubescentibus, cymis axillaribus densifloris, calycis brevissime pedicellati laciniis superioribus obtusis, vexilli ungue calycis tubo breviore, staminibus 9 monadelphis, ovario villoso, stylo brevi.—*D. ferruginea,* Hochst. Pl. Canar. exs. n. 343, non Roxb.—Caulis alte scandens, ramis sæpe valde intricatis curvatisque, novellis pubescentibus. Foliola vulgo semipollicaria v. breviora, maxima rarius pollicaria, læte-virentia, ætate glabrescentia v. plus minus pubescentia. Paniculæ axillares, folio breviores, a basi cymæformes, floribundæ. Flores 2 lin. longi. Ovarium longe hirsutum, ovulis 3–4. Legumen monospermum 1½–2-pollicare, 7–8 lin. latum, rarius dispermum 3-pollicare, et interdum fere 1 poll. latum, puberulum v. glabrescens, ad semina leviter reticulatum.

Hab. East Indian Peninsula, *Wight, G. Thomson, &c.*; Concan, *Stocks*; Bombay, *Nimmo, Dalzell.*

41. D. STOCKSII, sp. n., scandens, foliolis 11–17 obovatis v. late oblongis obtusissimis retusisve reticulato-venulosis novellis tomentosis, cymis in panicula subaphylla numerosis, calycis brevissime pedicellati dentibus superioribus obtusis, vexilli ungue calycis tubo breviore, staminibus 9 monadelphis, ovario glabro, stylo brevi, legumine ovato v. breviter oblongo.—*D. sympatheticæ* affinis, differt inflorescentia ante folia evoluta, ovario glaberrimo et legumine quam in omnibus *Dalbergiis* breviore. Foliola perfecte evoluta ¾–1 poll. longa, 5–6 lin. lata, glabrata. Flores 2 lin. longi. Calycis dens infimus cæteris duplo longior, acutus. Legumen 1 poll. longum, 7–8 lin. latum, glaberrimum, sæpius glaucescens, reticulatum, basi in stipitem 2–4 lin. longum angustatum. Semen unicum, maximam partem leguminis occupans.

Hab. Concan, *Stocks.*

Some of these specimens show in a remarkable degree the progressive development of the leaflets, the lowest of each leaf being often 6 lines long and 4 or 5 broad before the upper ones have begun to unfold.

42. D. GARDNERIANA (*Benth. in Pl. Hohen. exs.*), scandens, foliolis 7–11 oblongis ellipticisve obtusis retusisve coriaceis supra glabris creberrime venulosis subtus petiolisque rufo-villosis, cymis axillaribus sessilibus, calycis subsessilis rufo-villosi dentibus superioribus obtusis, petalis longe unguiculatis, staminibus 9 monadelphis, stylo subulato. —Foliola pleraque subpollicaria, supra nitidula, margine subrecurvo, petiolulo brevissimo. Flores 3 lin. longi. Petalorum ungues calycem subæquantes. Ovarium villosum, ovulis 2. Legumen non visum.

Hab. Nilgherries, *Gardner, G. Thomson, Hohenacker,* n. 1571.

Referred by Gardner to the *D. rubiginosa,* from which it differs in the dense hairs of the under side of the leaves, the more sessile flowers, hairy ovary, &c.

43. D. VELUTINA (*Benth. in Pl. Jungh.* i. p. 255 in adnot.), foliolis 13–17 oblongo-ellipticis membranaceis supra puberulis subtus ferrugineo-velutinis, paniculis axillaribus lateralibusque folio brevioribus, calycis subsessilis ferrugineo-villosi dentibus superioribus obtusis, petalis longe unguiculatis, staminibus 10 monadelphis, ovario glabro, stylo subulato.—*D. stipulata,* Wall. Catal. n. 5868 (non *D. stipulacea,* Roxb.).—Tota molliter ferrugineo-tomentosa v. villosa. Stipulæ in ramulis novellis 6–8 lin. longæ, lanceolatæ, obtusæ. Foliola 1½–2-pollicaria, mollia, vix demum supra glabrescentia. Paniculæ floribundæ, ramis ultimis confertim cymosis. Flores fere 3 lin. longi. Petalorum ungues calycem æquantes v. subsuperantes. Ovula 2. Legumen non visum.

Hab. Eastern India; Khasiya, *Wallich, Griffith*; Mergui, *Griffith*; Moolmyne, *Wallich*; Rangoon, *MacLelland.*

44. D. RUBIGINOSA (*Roxb. Pl. Corom.* ii. p. 9, t. 115), scandens, foliolis 5–7 ovatis v. elliptico-oblongis obtusis coriaceis glabris v. subtus minute puberulis, paniculis brevibus axillaribus, calycis breviter pedicellati rubiginoso-tomentosi dentibus obtusis æqualibus, petalis longe unguiculatis, staminibus 9 monadelphis, ovario glabro, stylo subulato.—Foliola 1–2-pollicaria, iis *D. rimosæ* subsimilia, magis tamen coriacea venis vix conspicuis. Pedicelli 1 lin. longi. Flores 3 lin. Calyx fere 2 lin., rubiginoso-tomentosus v. villosus. Petalorum ungues calycem æquantes. Ovula 2–3.

Hab. East Indian Peninsula, *Wight*; Concan, *Stocks*; Circars, *Roxburgh,* and again in Hong-Kong in South China, *Hance, Wright, Wilford,* but not hitherto received from any intermediate station.

45. D. CONGESTA (*Grah. in Wall. Catal.* n. 5872), scandens, foliolis 5–7 ovali-cuneatis emarginatis crebre tenuiter venulosis novellis utrinque pubescentibus, cymis axillaribus dense capitatis, calycis subsessilis glabrescentis dentibus obtusis, staminibus 9 monadelphis, petalis longe unguiculatis, ovario glabro, stylo subulato.—Verosimiliter varietas est *D. rubiginosæ.* Ex specimine manco vix differre videtur nisi calycibus fere glabris, et foliolis minoribus angustioribus.

Hab. East Indian Peninsula, Nilgherries, *Noton.*

46. D. DENSA (*Benth. in Lond. Journ. Bot.* ii. p. 217), scandens, foliolis 7–11 late oblongis v. ovali-ellipticis obtusissimis retusisve glabris v. subtus tenuissime pilosulis, paniculis brevibus axillaribus laxis vix puberulis, calycis breviter pedicellati glabri dentibus obtusis, petalis longe unguiculatis, staminibus monadelphis, stylo subulato.—Foliola 1–1½-pollicaria, tenuiter et crebre reticulato-venulosa. Pani-

culæ parum ramosæ, ramulis racemiformibus unilateralibus, v. breviter cymoso-ramosæ. Pedicelli 1 lin. Flores circa 2 lin. longi. Petalorum ungues calycem æquantes. Legumen non nisi junius vidi.

Hab. New Guinea, *Hinds.*

47. D. Hancei, sp. n., scandens, foliolis 9–11 anguste oblongis utrinque obtusis novellis subtus pilosulis demum glabratis, paniculis brevibus axillaribus confertis puberulis, calycis subsessilis puberuli dentibus obtusis, petalis longe unguiculatis, staminibus 9 monadelphis, stylo breviter subulato.—A *D. densa* differt imprimis foliolis dimidio minoribus, inflorescentia densiore magis pubescente. Foliola 6–9 lin. longa. Racemi confertiflori, juniores squamis concavis imbricatis involuti, rhachi rufo-tomentosa v. pubescente. Pedicelli vix ½ lin. longi. Flores fere 3 lin. Calyx latus, glabrescens, dentibus tubo multo brevioribus latis obtusissimisque. Ovarium glabrum. Legumen (vix maturum) 1¼ poll. longum, 4 lin. latum, apice rotundatum, basi in stipitem longe angustatum, ad semen vix induratum.

Hab. Hong-Kong, *Hance, Wilford.*

48. D. tamarindifolia (*Roxb. Fl. Ind.* iii. p. 233), scandens, ferrugineo-pubescens, foliolis 25–40 anguste oblongis obtusis inæquilateris, cymis brevibus densifloris, calycis subsessilis dentibus obtusis, petalis longe unguiculatis, staminibus monadelphis, ovario glabro, stylo subulato.—Wight, Ic. t. 242; *D. multijuga*, Grah. in Wall. Catal., n. 5865; *D. rufa*, Grah. in Wall. Catal., n. 5864; *D. Blumei*, Hassk. Pl. Jav. Rar., p. 400; *D. acaciæfolia*, Dalz. in Kew. Journ. Bot. ii. p. 37; *Derris pinnata*, Lour. Fl. Cochinch. p. 432.—Foliola 6–9 longa, 2–3 lin. lata, novella utrinque pubescentia v. villosa, adulta sæpe glabrescentia, variant tamen etiam adulta subtus dense rufo-villosa et minus inæqualia, v. demum glabra rigidula et valde inæqualia. Paniculæ cymosæ, 1–1½-pollicares. Flores *D. densæ*, fere 3 lin. longi. Bracteolæ parvæ, latæ. Stamina 9, rarius 10. Ovula 2–3. Legumen 1½–3 poll. longum, 6–7 lin. latum, 1–2-spermum, ad semina vix induratum, glabrum, læve et sæpius rubens.

Hab. East India, in the Peninsula, *Wight*; Canara, *Dalzell*; Concan, *Stocks*; Nepal and Silhet, *Wallich*; Sikkim, *Hooker*; Assam, *Jenkins*; Penang and Moolmyne, *Wallich, Helfer*; Sumatra, *Marsden*; Java, *Zollinger*, n. 1754.

49. D. polyphylla (*Benth. Pl. Jungh.* i. p. 256 in adnot. excl. pl. Chinensi), scandens, foliolis 25–50 parvis lineari-oblongis glabris v. parce pilosulis, cymis axillaribus brevibus pubescentibus, calycis subsessilis dentibus obtusis, petalis longe unguiculatis, staminibus monadelphis, ovario glabro, stylo longe subulato.—Foliola approximata, 4–6 lin. longa, subcoriacea, basi vix obliqua. Paniculæ cymosæ, confertifloræ. Flores 3 longi, iis *D. tamarandifoliæ* similes.

Hab. Philippine Islands, *Cuming*, n. 1164.

Series 5. *Dalbergariæ Gerontogeæ.*

50. D. PANICULATA (*Roxb. Pl. Corom.* ii. p. 8. t. 114), arborea, foliolis 9–13 obovatis oblongis ovalibusve obtusissimis retusisve glabris, paniculis subcymosis axillaribus villosis, calycis subsessilis villosi dentibus acutis, vexillo angusto, staminibus isadelphis, ovario glabro.—Foliola vulgo circa 1 poll. longa, 8–9 lin. lata, apice rotundata, versus basin angustiora, variant majora v. minora, rarissime 2-pollicaria, nonnunquam obovata et basi acuta, rarissime basi quam apice latiora, adulta rigidula et utrinque insigniter villosa. Paniculæ per anthesin rufo-villosæ, breves, confertifloræ, fructiferæ laxiores et glabriores. Flores fere 3 lin. longi. Petala quam in sequentibus angustiora, unguibus calycis tubum æquantibus. Ovarium glaberrimum v. basi leviter ciliato-hirtum. Ovula 2–3. Legumen 1½–2½ poll. longum, 6–9 lin. latum, 1–2-spermum, apice basique angustatum.

Hab. East India; occurs in most collections from the Peninsula up to Bombay; also in Central India, *Edgeworth, Hooker.*

51. D. ASSAMICA (*Benth. in Pl. Jungh.* i. p. 255 in adnot.), scandens, puberula v. glabrescens, foliolis 15–21 dissitis oblongo-ellipticis obtusis retusisque, paniculis axillaribus laxis folio multo brevioribus, bracteis caducissimis, calycis pedicellati dentibus acutis summis brevissimis recurvis, vexillo lato, staminibus isadelphis, ovario hispido.—Petioli communes ut in *D. hircina* elongati, 8–10-pollicares. Foliola 1½ v. fere 2 poll. longa, 8–10 lin. lata. Paniculæ laxæ, 4–6-pollicares. Pedicelli tenues, 1–1½ lin. longi. Flores circa 3 lin. Calycis dentes 2 summi late recurvo-falcati, brevissime acutati, laterales parvi, infimus linearis elongatus. Petala *D. lanceolariæ.* Ovarium breviter stipitatum, ovulis 4, stylo subulato. Legumen non visum.

Hab. Northern India, Assam, *Griffith, Jenkins*; Subsiwaliks, *Edgeworth.*

52. D. LANCEOLARIA (*Linn., D.C. Prodr.* ii. p. 417), arborea, foliolis 11–15 ovalibus v. late oblongis obtusissimis retusisve glabris, paniculis subaphyllis rufo-pubescentibus laxis, calycis pedicellati dentibus summis obtusis, vexillo lato, staminibus isadelphis, ovario glabro v. basi villosulo.—Wight, Ic. t. 266; *D. frondosa,* Roxb. Fl. Ind. iii. p. 226; *D. zeylanica,* Roxb.? Wall. Catal. n. 5847 A; *D. arborea,* Heyne in Roth. Nov. Pl. Sp. p. 330.—Foliola 1–1½-pollicaria, etiam novella glabra, longiuscule petiolulata. Paniculæ amplæ, per anthesin aphyllæ, e cymis laxiusculis constantes. Pedicelli fere lineam longi. Flores in genere majusculi, fere 5 lin. longi. Calycis turbinati dentes summi obtusi, laterales acutiusculi, infimus longior acutus. Vexillum obovatum, basi supra unguem ut in nonnullis affinibus leviter incrassatum. Ovula 3. Legumen longe stipitatum, monospermum 1½–2 poll. longum, 2–3-spermum usque ad 4 poll. longum, 8–9 lin. latum, vix tenuissime reticulatum.

Hab. East Indian Peninsula, occurring in most collections, and extending southward to Ceylon and northward to Bombay, but not received from central, northern, or eastern India.

53. D. HIRCINA (*Ham. in Wall. Catal.* n. 5871), foliolis 13–19 ovalibus v. obovali-oblongis obtusissimis retusisve pubescentibus, cymis axillaribus brevibus densifloris, calycis breviter pedicellati villosi dentibus omnibus obtusis, vexillo lato, staminibus isadelphis, ovario villosulo.—Affinis *D. lanceolariæ*. Folia longiora, petiolo communi 6–10-pollicari, foliolis 1–1½-pollicaribus, minus dissitis, novellis sericeis. Paniculæ e cyma unica v. paucis compositæ, breviter pedunculatæ rufo-pubescentes, confertifloræ. Pedicelli ½ lin. v. fructiferi vix 1 lin. longi. Flores vix 3 lin. Calyx quam in *D. lanceolaria* multo brevior, dente etiam infimo obtuso. Ovula 4. Legumen quam in affinibus multo angustius, 1½–2-poll. longum, 3–4 rarius 5 lin. latum, 1–4-spermum.

Hab. Northern India, Nepal and Deyra Dhoon, *Wallich*; Gurwhal and Kumaon, outer hills and valleys, and in the Terai, *Royle*, *Edgeworth*, *Strachey & Winterbottom*, *Madden*, *Thomson*.

54. D. VOLUBILIS (*Roxb. Pl. Corom.* ii. p. 48. t. 191), scandens, foliolis 11–13 obovali v. ovali-oblongis obtusis retusisve glabris supra venosis subtus minute impresso-reticulatis, paniculis per anthesin aphyllis, cymis confertis pubescenti-villosis, calycis subsessilis villosuli dentibus superioribus obtusis, vexillo lato, staminibus isadelphis, ovario villosulo. —A *D. lanceolaria* differt caule scandente, cymis confertis, floribus minoribus. Inflorescentia *D. confertifloræ*, sed stamina constanter etiam in alabastro in phalanges 2 disposita. Foliola 1–1½-pollicaria, etiam novella glabra. Pedicelli ½ lin. longi, flores 3–4 lin. Ungues petalorum tubo calycis breviores. Ovarium longiuscule stipitatum, ovulis 2. Legumen non visum.

Hab. East India, mountainous countries on the coast, *Roxburgh*; Kumaon, *Strachey & Winterbottom*; Central India, plains of Behar, Sikkim, lower hills and Terai, *Hooker*; Chittagong, *Hooker*; Rangoon, *MacLelland*.

55? D. PURPUREA (*Wall. Catal.* n. 5869), scandens? foliis floribusque *D. volubilis*, inflorescentia laxiore, pedicellis 1–1½ lin. longis et vexillo, ut videtur, angustiore. An hujus var. *laxiflora*? an *D. frondosæ* var. *parviflora*?—*D. elliptica*, Spanoghe Linnæa, xv. p. 196? excl. descr. leguminis?

Hab. Moolmyne, *Wallich*, *Griffith*.

The specimens are very imperfect, and seem to connect the arboreous *D. lanceolaria* with the climbing *D. volubilis* and *D. saxatilis*. Those gathered in Canara by *Hohenacker*, n. 561, belong to the same category. These difficulties cannot be cleared up until good specimens in fruit, as well as in flower, of the several forms shall have been obtained and compared.

56. D. SAXATILIS (*Hook. fil. Fl. Nig.* p. 314), scandens, foliolis 9–11 oblongis obtusis retusisve glabris utrinque venulosis, paniculis laxe subcymosis axillaribus terminalibusque vix tomentellis, calycis pedicel-

lati glabrati dentibus summis obtusis, vexillo lato, staminibus isadelphis, ovario glabriusculo, legumine maximo lævi.—*D. volubili* valde affinis. Inflorescentia laxior et glabrior et legumen peculiare verosimiliter diversum. Foliola pleraque 1½-pollicaria, maxima 2 poll., nonnulla vix 1 poll. longa, latiuscule oblonga, subtus pallida, venis tamen quam in *D. volubili* magis conspicuis. Pedicelli 1 lin. v. paullo longiores. Flores fere *D. lanceolariæ* nisi minores, 3–3½ lin. longi. Calyx in sicco nigrescens. Ovula 3–4. Legumen (a Heudelotio missum) 4 poll. longum, 1¼ poll. latum, stipite 4–5 lin. longo, tenue, læve, glaucescens, medio monospermum et vix tenuissime reticulatum.

Hab. Tropical Africa, Senegambia, *Heudelot.* n. 717; Sierra Leone, *Don, Ansell, Barter.*

57. D. MELANOXYLON (*Guill. et Perr. Fl. Seneg.* p. 227. t. 53), fruticosa, spinescens, foliolis 9–13 (parvis) late ovali-oblongis obtusissimis retusisve glabris, paniculis laxe subcymosis folio subbrevioribus puberulis, calycis pedicellati glabri dentibus summis obtusis, staminibus isadelphis, ovario glabro, stylo brevissimo.—A *D. saxatili* differt imprimis foliolis floribusque minoribus, pedicellis gracilibus. Stylo brevi et unguibus petalorum minus elongatis approximatur *Triptolemeis*. Ramuli hinc inde in spinas validas mutantur. Foliola 6–8 lin. longa, circa 4 lin. lata. Flores vix 2½ lin. longi, pedicello 1 lin. Legumen 1½–2-pollicare, 1–2-spermum, medio 6 lin. latum, apice basique breviter acutatum, ad semen non induratum, venis paucis a margine oriundis percursum, v. læve.

Hab. Tropical Africa, Senegal, *Lelievre, Heudelot*; Æthiopia, *Kotschy*, n. 391; Abyssinia, *Schimper*, ser. ii. n. 885 and ser. iii. n. 1737, *Plowden*; Mozambique, *Peters.*

58. D. PUBESCENS (*Hook. fil. Fl. Nig.* p. 315), subscandens, foliolis 11–15 oblongis v. obovali-oblongis obtusis glabris v. subtus pubescentibus, paniculis confertis vix cymosis folio brevioribus rufo-pubescentibus, calycis breviter pedicellati dentibus summis obtusis, vexillo angusto, staminibus isadelphis, ovario glabro.—“Frutex subsarmentosus parum ramosus 3–4-metralis.” Foliola 1–1½-pollicaria, supra opaca glabra aut vix ad costam puberula, subtus sæpius rubescentia glabra v. præsertim ad costam pubescentia, venis vix conspicuis. Paniculæ axillares et terminales, e racemis brevibus unilateralibus simplicibus v. parum ramosis compositæ. Pedicelli ½ lin., flores 3–4 lin. longi. Calyx brevis, latus, dentibus inferioribus acutiusculis. Petalorum ungues calyce sublongiores. Vexillum vix cæteris petalis latius. Ovarium longe stipitatum, ovulis 4, stylo subulato. Legumen non visum.

Hab. Tropical Africa, Senegambia, *Heudelot*, n. 895; Sierra Leone, *Don, Miss Turner.*

59. D. STIPULACEA (*Roxb. Fl. Ind.* v. 3. p. 233), fruticosa, glabrescens, foliolis 17–25 oblongis obtusis retusisve, racemis axillaribus lateralibusve laxis, bracteis bracteolisque persistentibus, his calyce

sublongioribus, calycis longe pedicellati dentibus summis obtusis, vexillo lato, staminibus isadelphis.—Wight, Ic. t. 243; *D. ferruginea*, Roxb. Fl. Ind. iii. p. 228 ex descr.; *D. tingens*, Ham. in Wall. Catal. v. 5860; *D. cassioides*, Wall. Catal. n. 5861; *D. livida*, Grah. in Wall. Catal. n. 5866.—Foliola subpollicaria, tenuissime et non crebre venulosa. Inflorescentiæ 2–4-pollicares, minus ramosæ quam in cæteris speciebus, siccitate sæpe nigricantes. Pedicelli 2–2½ lin. longi, secundi. Bracteæ et bracteolæ conspicuæ, 1½–2 lin. longæ, foliaceæ, et fere omnes etiam post flores delapsos persistunt. Flores 3–3½ lin. longi. Calycis dens infimus linearis. Ovarium longiuscule stipitatum, ciliatum. Legumen glaberrimum, glaucum, circa 3 poll. longum et 1 poll. latum, monospermum, medio leviter incrassatum et corrugatum.

Hab. Northern and Eastern India; Silhet, *Wallich*; Assam, *Jenkins*; Sikkim, lower hills, *Hooker*; Tavoy and Martaban, *Wallich*.

60? D. LUZONIENSIS (*Vog. Pl. Meyen.*, p. 33), subglabra, foliolis sub 16 oblongis obliquis subemarginatis subtus discoloribus pubescentibus, racemis axillaribus petiolo brevioribus, calyce pedicellato brevi glabro, dente infimo acuto.—Foliola ½ poll. longa, 4 lin. lata, supra glabra nitentia, subtus pube adpressa tecta, rigide membranacea. Pedicelli vix 3 lin. longi. Legumen usque ad 2 poll. longum, ½ poll. latum, stipite calycem parum superante. Flores ignoti.

Hab. Philippines, Luçon, *Meyen*.

Unknown to me. From the simple inflorescence and long pedicels I should presume it to be near the *D. stipulacea*.

61. D. FLEXUOSA (*Grah. in Wall. Catal.* n. 5875), scandens? foliolis 7–11 ovatis v. ovali-oblongis acuminatis coriaceis supra nitidulis subtus pauciveniis ad costam hispidis, paniculis laxis folio subbrevioribus ferrugineo-tomentosis, calycis subsessilis dentibus obtusis, staminibus isadelphis, ovario hirsuto.—Ab omnibus affinibus differt foliolis (in specimine vix perfecte evolutis) 2–2½-pollicaribus nitidisque apice breviter et obtuse acuminatis, basi rotundatis, petiolulo 3 lin. longo. Paniculæ semipedales, axillares et infrafoliaceæ. Pedicelli raro ½ lin. longi. Flores circa 3 lin. Vexillum orbiculatum, ungue calycem æquante. Ovarium longe stipitatum, ovulis 2, stylo subulato. Legumen non visum.

Hab. Silhet, *Wallich*.

Series 6. *Selenolobia*.

62. D. MONOSPERMA (*Dalz. in Kew Journ. Bot.* v. 2. p. 36), scandens inermis, foliolis sub-5 obovatis v. obovali-oblongis obtusissimis retusisve glabris v. subtus vix puberulis, racemis axillaribus brevibus simplicibus subcymosisve, calycis breviter pedicellati lati dentibus obtusis, petalis longe unguiculatis, staminibus monadelphis, legumine lunulato. —*D. torta*, Grah. in Wall. Catal. n. 5879.—Tota glabra subglaucescens v. pubes minuta in pagina inferiore foliolorum in petiolis et inflores-

centia. Foliola pollicaria v. minora, tenuissime reticulato-pennivenia. Racemi ½–1-pollicares, unilaterales, nunc simplices et solitarii, sæpius terni v. in cymas breves excrescentes. Flores 3–4 lin. longi, pedicello vix ½ lin. excedente. Stamina 10, monadelpha, vagina hiante. Ovarium glabrum, 2-ovulatum, stylo subulato inflexo. Legumen 1 poll. longum, 6 lin. latum, breviter stipitatum, falcato-lunatum, crassiusculum, læve, monospermum.

Hab. East India, Ceylon, *Thwaites, Walker,* &c.; the Peninsula, *Heyne, Wight*; prov. Malwah, *Dalzell*; Penang and Singapore, *Wallich,* Catal. n. 5873; Malacca, *Griffith*; China, *Millett.* Some specimens also are mixed in the Wallichian Collection under n. 5848 I, with those of D. *confertiflora* from Sillet, but possibly not gathered there.

63. D. SPINOSA (*Roxb. Fl. Ind.* iii. p. 233), fruticosa, glabra, spinescens, foliolis 7–11 cuneato-oblongis obtusissimis retusisve, racemis axillaribus brevissimis subcymosis, floribus parvis breviter pedicellatis, calycis dentibus obtusis, staminibus isadelphis, legumine brevi reniformi v. sublunulato.—*D. horrida,* Grah. in Wall. Catal. n. 5877 ex parte.—Foliola quam in *D. spinosa* minora. Flores multo minores, vix 2 lineas excedunt. Calyx tenuis, submembranaceus, glaber. Petalorum ungues breves. Legumen vix pollicare, quam in *D. monosperma* latius, et sæpius reniforme quam lunulatum, minusque incrassatum, interdum vero omnino *D. monospermæ* conforme.

Hab. East India, Chittagong, *Roxburgh*; Sunderbunds, *Hamilton*; also in the Peninsula from a single imperfect specimen, *Wight,* n. 798.

64. D. INUNDATA (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 29–35, anguste oblongis obtusis novellis inflorescentiaque aureo-sericeis demum glabratis subtus discoloribus, calycis dentibus acutis, staminibus varie connatis, legumine falcato-lunulato.—Foliola semipollicaria, 2–3 lin. lata. Racemuli laterales fasciculati, 1–2-pollicares. Flores 4 lin. longi, breviter pedicellati. Stamen vexillare et interdum carinale liberum, cætera isadelpha, v. 9 connata. Legumen subsessile, lunulatum, 10–22 lin. longum, 5 lin. latum, ut in *D. monosperma* crassiusculum.

Hab. North Brazil, *Spruce,* distributed originally in flower as *Miscolobium inundatum,* and afterwards in fruit as *Drepanocarpus discolor.*

Doubtful Species.

D. Mooniana, Thw. Enum. Ceyl. Pl. p. 93, from Ceylon, is known only from fruiting specimens, which differ much from the rest of the genus, both in the pod, which is nearly that of a *Derris,* and in inflorescence; whilst the alternate leaflets preclude the enumerating it under the latter genus. It must remain doubtful until the flower has been seen.

D. rotundifolia, Sond. Linnæa, v. 23, p. 35, from South Africa, described from fruiting specimens only, is more probably a *Lonchocarpus.* I have not, however, seen the specimens myself.

D. ougeinensis, Roxb., now forms the genus *Ougeinia* in Hedysareæ. *D. pubinervis*, Spanoghe, *D. venusta*, Zippel., the whole section *Brachypterum*, W. et Arn., and several *Dalbergias* of the older authors are species of *Derris*. *D. angustifolia*, Hassk., *D. Barclayana*, Hook., *D. striata*, Boj., *D. tephrosioides*, W. et Arn., and some others belong to *Millettia* or *Mundulea*.

II. Ecastaphyllum, *Pers.*

Flos omnino *Dalbergiæ*. Legumen orbiculatum v. breviter oblongum, planum v. demum suberoso-incrassatum, indehiscens, monospermum, ad suturam vexillarem submarginatum. Semen reniforme.—Frutices laxe ramosi v. sarmentoso-subscandentes, Austro-Americani etiam per Africam calidiorem dispersi, in omnibus præter legumen cum *Dalbergia* convenientes.

1. E. Brownei (*Pers., DC. Prod.* ii. p. 420), foliolis omnibus solitariis ovatis obtuse acuminatis subtus ramulisque tomentosis v. rarius glabrescentibus pallidis, staminibus 10, legumine orbiculato demum incrassato-corrugato.—*E. molle*, Miq. Linnæa, xix. p. 437.—Foliolum vulgo 3–4 poll. longum, acumine quam in *E. monetaria* multo breviore, supra opacum nec nitidum, subtus raro glabrescens. Racemi fasciculato-subcymosi, axillares v. laterales, breves, confertiflori. Flores circa 4 lin. longi. Legumen pollicem diametro.

Hab. Tropical America, especially near the sea, from South Brazil to Florida, the West Indies, and Central America; also in West Tropical Africa.

2. E. monetaria (*Pers., DC. Prodr.* ii. p. 421), foliolis 3–5, rarius solitariis, ovatis acuminatis concoloribus glabris v. subtus ramulisque pube minuta conspersis, staminibus 9, legumine glabro læviusculo rarius incrassato.—*E. Richardi* et *E. Plumieri*, Pers. Syn. ii. p. 277; *E. Berterii*, DC. Prod. ii. p. 421; *E. hygrophilum* et *E. nitidum*, Mart., Benth. in Ann. Mus. Vind. ii. p. 93; *E.* (v. H.) *Benthamianum*, Miq. in Linnæa, xviii. p. 575.—Caulis scandens. Foliola nunc omnia 3–5-foliolata, 2–4-pollicaria, nunc pleraque (nec omnia) solitaria et nonnunquam usque ad 7–8 poll. longa, 3–4 poll. lata. Inflorescentia *E. Brownei*. Flores paullo minores. Legumen vulgo subpollicare, 9 lin. latum, fere planum, crassiusculum et læve, nonnunquam medio plus minus suberoso-incrassatum et corrugatum.

Hab. Tropical America, North Brazil, Cayenne, Surinam (*Hostmann*, n. 184); British Guiana (*Schomburgk*, 1st coll. n. 492); Trinidad, *Purdie*; St. Domingo, *Bertero*, *Schomburgk*, n. 85.

β? Riedeli, foliolis vulgo minoribus, minus acuminatis, subtus ramulis inflorescentiaque tomento brevissimo ferrugineis v. subsericeis, legumine tomentello sæpius incrassato.

Hab. North Brazil, and apparently in Senegambia, also, judging from a single specimen in fruit only, from the Rio Nuñez, *Heudelot*, n. 623.

The foliage and fruits assume in this species such a variety of forms that it is often difficult to believe that single specimens do not belong to distinct species till we have to turn over large masses of specimens, often showing two such supposed species from the same stem.

3. E. PUBESCENS (*DC. Prod.* ii. p. 421), foliolis 5–11 ovatis oblongisve acuminatis utrinque ramulis inflorescentiaque pubescenti-hirtis, legumine suborbiculato-tomentoso.—Ab *E. monetaria* differt foliolis multo minoribus numerosioribus, pube præsertim in ramulis patente, tenuiter rufescente. Foliola maxima 2-pollicaria, pleraque 1–1½ poll. longa. Flores quam in *E. monetaria* minores. Legumen 1¼–1½ poll. longum, 1 poll. latum, reticulato-venosum, in speciminibus a me visis vix incrassatum, sed nondum maturum.

Hab. Cayenne, *Martin.*

4. E. GLAUCUM (*Desv. Ann. Sc. Nat. Par.* ser. 1. ix. p. 423), foliolis 5–7 oblongis glabris subtus glaucis crebre venulosis, legumine suborbiculato crassiusculo lævi glabro.—*E. foliosum*, Benth. in Hook. Journ. Bot. ii. p. 64.—Foliola subcoriacea quam in *E. pubescente* paullo majora, iis tamen *E. monetariæ* multo minora et angustiora, crebre subparallele venulosa nec subremote pennivenia. Flores *E. monetariæ.* Legumen 6–9 lin. longum et latum, crassiusculum sed planum.

Hab. Cayenne, *Martin in Herb. Par.*; Portorico *in Herb. Desv.*, but probably this is one of the mistakes Desvaux frequently made in entering the stations of his specimens in his herbarium from recollection.

5. E.? TOMENTOSUM (*Spruce, Benth. in Mart. Fl. Bras. Leg.*, ined.), foliolis 5–7 ovatis vix acuminatis utrinque ramulisque molliter pubescentibus, legumine (oblongo?) glabro.—Scandens. Foliola 1½–3-pollicaria. Racemi ut in præcedentibus breves, numerosi, confertim subpaniculati. Stamina isadelpha. Legumen junius 9 lin. longum 3 lin. latum; perfectum non vidi.

Hab. North Brazil. *Spruce.*

Till the ripe fruit has been seen, it must remain uncertain whether this is an *Ecastaphyllum* or a *Dalbergia*.

III. CYCLOLOBIUM, *Benth.*

Calyx campanulatus, 5-dentatus. Carina petala dorso imbricantia v. leviter connata. Stamen vexillare liberum, cætera connata. Antheræ versatiles. Ovarium pluriovulatum. Legumen stipitatum, orbiculatum (v. late falcatum?) membranaceum, indehiscens, ad semina vix incrassatum, sutura vexillari anguste alata, stylo terminali. Semina 2–3, oblonga, transversa, embryone recto.—Frutices Austro-Americani. Folia alterna, petiolo apice unifoliolato, sæpe bistipellato. Racemi axillares v. laterales, subsimplices, solitarii v. fasciculati. Pedicelli solitarii, bracteolis minutis caducis.

1. C. BRASILIENSE (*Benth. in Ann. Mus. Vind.* ii. p. 92 *et in Mart. Fl. Bras. Leg.*, ined.), foliolo breviter petiolato ovali-oblongo basi rotun-

dato-angustato, novellis subtus ferrugineo-puberulis, stipellis minutis, racemis pubescentibus, ovulis circa 4.—Foliola sæpius 1–1½ poll. longa, rarius 2–2½ poll., latitudine varia, petiolo 2–3 rarius 4 lin. longo. Racemi folio breviores. Legumen 9–10 lin. diametro.

Hab. Brazil (Minas Geraes?), *Pohl.*

2. C. Clausseni (*Benth. in Hook. Journ. Bot.* ii. p. 64, *et in Mart. Fl. Bras. Leg.* ined.), foliolo longiuscule petiolato ovato-lanceolato suboblongove basi subcordato glabro, stipellis minutis, racemis pubescentibus, ovulis circa 4.—Foliola 3–6-pollicaria, basi quam in præcedente latiora, petiolo 8–10 lin. longo. Racemi 1–2-pollicares. Flores 4–5 lin. longi. Legumen junius ei *C. brasiliensis* simillimum.

Hab. Brazil, prov. Minas Geraes.

3. C. Blanchetianum (*Tul. in Arch. Mus. Par.* iv. p. 84), foliolo longiuscule petiolato ovato-lanceolato oblongove basi rotundato v. subcordato glabro, stipellis setaceis petiolulum æquantibus, racemis puberulis, ovulis 2.—Folia *C. Clausseni,* a quo hæc species paullulum differt stipellis, ovario, et alis petalisque carinalibus prope basin plica saccata auctis quam in *C. Clausseni* evidentiore. Legumen non visum.

Hab. Brazil, prov. Bahia (*Blanchet,* n. 2319).

4. C. Hostmanni, sp. n., foliolo longe petiolato elliptico-oblongo basi acutiusculo glabro, stipellis inconspicuis, racemis vix puberulis, calycis laciniis tubo longioribus, ovulis 6–8.—Foliola 4–8 poll. longa. Calyx 3–3½ lin. longus, basi quam in præcedentibus magis attenuatus, dentibus 3 inferioribus profundius solutis, 2 summis alte connatis. Petala fere *C. Blanchetiani.* Legumen junius longe stipitatum et valde falcatum, perfectum verosimiliter ut in præcedentibus orbiculatum.

Hab. Surinam, *Hostmann,* n. 172.

IV. Machærium, *Pers.*

Calyx truncatus, breviter 5-dentatus, basi obtusus. Vexillum basi nudum, extus sæpe sericeum. Carinæ petala dorso connata. Stamina monadelpha v. æqualiter diadelpha v. vexillare solutum. Antheræ versatiles. Ovarium sæpius stipitatum, uniovulatum, rarissime biovulatum, disco cupuliformi basi sæpius circumdatum. Legumen compressum, samaroideum, indehiscens, basi plus minus incrassatum et monospermum, sutura vexillari ad semen plus minus intrusa, superne in alam oblongam attenuatum; stylo terminali.—Caulis lignosus, arboreus fruticosus v. alte scandens. Folia impari-pinnata, foliolis plerisque alternis exstipellatis. Stipulæ in speciebus scandentibus sæpe indurato-spinescentes. Racemuli breves, secundiflori, fasciculati v. ramosi, axillares v. in paniculam terminalem dispositi. Pedicelli breves, nunc brevissimi. Bracteæ parvæ, caducæ. Bracteolæ sub calyce vulgo orbiculatæ, persistentes. Flores parvi v. mediocres, purpurei violacei v. albi. Species omnes ex America australi v. centrali.

§ 1. Lineata. Foliolorum venæ primariæ a costa divergentes crebræ, subcontiguæ, parallelæ, vix anastomosantes. Stipulæ sæpius indurato-spinescentes.

* *Foliolis obtusis v. retusis, oblongis v. linearibus, sæpius parvis.*

1. M. longifolium. (Brasilia bor.)
2. M. angustifolium. (A Brasilia ad Amer. centralem.)
3. M. amplum. (Brasilia.)
4. M. aculeatum. (Brasilia.)
5. M. splendens. (Brasilia.)
6. M. uncinatum. (Brasilia.)
7. M. robiniæfolium. (Ind. occident.)
8. M. pilosum. (Brasilia bor.)
9. M. eriocarpum. (Brasilia.)

** *Foliolis acutis v. acuminatis, ovatis v. latiuscule oblongis.*

10. M. discolor. (Brasilia.)
11. M. Humboldtianum. (America tropica.)
12. M. Vellosianum. (Brasilia.)

§ 2. Oblonga. Foliola sæpius parva et numerosa, rarius pollicaria, oblonga v. linearia, obtusa v. retusa, penninervia, venulis (parum prominentibus) irregulariter arcuato-anastomosantibus. Differunt a *Lineatis obtusifoliis* foliolorum venis primariis minus crebris et evidentius anastomosantibus, ab *Acutifoliis Reticulatisque,* foliolis sæpius parvis numerosis, ab illis etiam foliolis obtusis.

* *Stipulis indurato-spinescentibus.*

13. M. gracile. (Brasilia.)
14. M. nictitans. (Brasilia.)

** *Inermes, stipulis deciduis v. nullis (nonnullæ, venulis crebrioribus, a* Lineatis *differunt imprimis caule inermi).*

15. M. scleroxylon. (Brasilia.)
16. M. sordidum. (Brasilia.)

17? M. Moritzianum. (Venezuela.)

18. M. myrianthum. (Brasilia bor.)
19. M. Goudoti. (N. Grenada.)
20. M. Gardneri. (Brasilia.)
21. M. polyphyllum. (Cayenna.)

§ 3. Acutifolia. Foliola (sæpius pollicaria v. longiora et subnumerosa) lanceolata v. ovato-lanceolata, v. acute oblonga, pennivenia, venulis reticulatis v. intra marginem arcuato-anastomosantibus. Species omnes inermes et pleræque arborescentes. Ab *Oblongis* differunt foliolis acutioribus et sæpius majoribus, a *Reticulatis* foliolis angustioribus potius acutatis quam acuminatis, a *Penninerviis* venatione et foliolis vulgo minoribus numerosioribus.

22. M. parviflorum. (Brasilia.)

23. M. incorruptibile. (Brasilia.)
24. M. firmum (foliola obtusiuscula). (Brasilia.)
25. M. legale. (Brasilia.)
26. M. villosum. (Brasilia.)
27. M. mucronulatum. (Brasilia.)
28. M. acutifolium. (Brasilia.)
29. M. stipitatum. (Brasilia.)

§ 4. Reticulata. Foliola (pollicaria v. longiora) ovata v. oblonga, obtusa v. obtuse acuminata, pennivenia, venulis irregulariter reticulatis v. intra marginem arcuato-anastomosantibus. Species pleræque arborescentes et inermes, paucæ scandentes stipulis hinc inde indurato-spinescentibus. Differunt ab *Oblongis* foliolis majoribus latioribus sæpe acuminatis et in folio paucioribus, ab *Acutifoliis* foliolis obtuse acuminatis, a *Penninerviis* venatione foliolorum.

30. M. leucopterum. (Brasilia.)
31. M. glabrum. (Brasilia.)
32. M. violaceum. (Brasilia.)
33. M. secundiflorum. (Brasilia.)
34. M. Salzmanni. (Brasilia.)
35. M. Allemani. (Brasilia.)
36. M. Brasiliense. (Brasilia.)
37. M. densicomum. (Brasilia bor.)
38. M. erianthum. (Brasilia.)
39. M. vestitum. (Brasilia.)
40. M. triste. (Brasilia.)
41. M. oblongifolium. (Brasilia.)
42. M. Seemanni. (America centralis.)
43. M. pedicellatum. (Brasilia.)
44. M. bracteatum. (N. Grenada.)
45. M. acuminatum. (Venezuela.)
46. M. leiophyllum. (Guiana.)
47. M. Schomburgkii. (Guiana.)
48. M. opacum. (Brasilia.)

§ 5. Penninervia. Foliola ultrapollicaria, sæpius ampla, ovata v. oblonga, obtusa v. acuminata, rarius acuta, venis primariis inter se dissitis et parallelis a costa usque ad marginem prominentibus (rarius juxta marginem arcuato-anastomosantibus), rete venularum intermedia subtransversa tenui.

49. M. lanatum. (Brasilia.)
50. M. nigrum. (Brasilia.)
51. M. Lindenianum. (Venezuela.)
52. M. ferrugineum. (Brasilia sept.; Guiana.)
53. M. macrophyllum. (Brasilia sept.)
54. M. Kegelii. (Surinam.)

55. M. eriostemon. (Brasilia.)

56. M. floribundum. (Guiana, Brasilia bor. et occid.)

§ 1. Lineata.

1. M. longifolium (*Benth. in Mart. Fl. Bras. Leg.* ined.), stipulis lato-lanceolatis demum indurato-spinescentibus, foliolis 25–35 lineari-oblongis obtusis retusisve crebre lineato-venosis utrinque pilosis, racemis laxe subpaniculatis rufo-pubescentibus glabratisve, staminibus isadelphis, carina ovarioque valde arcuatis.

Hab. North Brazil (*Spruce*, n. 1661).

Differs from the *M. angustifolium* chiefly in its longer, more hairy, and thinner leaflets, and some other details which give it a very distinct aspect.

2. M. angustifolium (*Vog. Linnæa*, xi. p. 193), stipulis induratis demum spinescentibus, foliolis 25–61 lineari-oblongis obtusis retusisve crebre lineato-venosis glabris v. subtus minute puberulis, racemis paniculatis fusco-pubescentibus, staminibus isadelphis, carina ovarioque valde arcuatis.—*M. affine*, Benth. in Ann. Mus. Vind. ii. p. 100; *M. acaciæfolium*, Mart. Herb. Fl. Bras. n. 1310; *M. armatum*, Vog. Linnæa, xi. p. 191 (specimina cujabensia foliolis paullo longioribus latioribusque); *Drepanocarpus isadelphus*, G. F. W. Mey. in Act. Acad. Nat. Cur. xii. p. 807 ex descr.; *M. violaceo-purpureum*, Duchass. in Walp. Ann. ii. p. 437.—Foliola vulgo vix ½–1 poll. longa, 2–2½ lin. lata. Flores 5–6 lin. longi, vexillo subsericeo. Legumen rectiusculum ad semen vix introrsum.

Hab. Widely spread over South America, frequent in Brazil, both southern and northern (*Blanchet*, n. 29, 2297, 2416); in Eastern Peru, Tarapoto, *Spruce*, n. 4556; in British Guiana, *Schomburgk*, 1st coll. no. 78; Venezuela, *Funcke*, n. 405; N. Grenada, *Holton*, n. 982; Panama, *Hinds, Duchassaing*.

Fendler's n. 2228 from Venezuela, of which I have seen only a poor specimen, may be a variety of this species. His n. 1750 and 1866 of the 2nd coll., described below under *M. Moritzianum*, have also nearly the venation of this and the next species, but with rather more reticulation.

3. M. amplum (*Benth. in Ann. Mus. Vind.* ii. p. 97, *et in Mart. Fl. Bras. Leg.* ined.), stipulis brevibus demum indurato-spinescentibus, foliolis 11–17 oblongis obtusis retusisve crebre lineato-venosis glaberrimis, racemis ample paniculatis vix canescenti-puberulis, staminibus monadelphis, carina ovarioque incurvis.—Foliola quam in præcedente majora, pauciora. Flores paullo majores, vexillo sericeo. Carina minus arcuata. Staminum vaginam in dorso semper per anthesin integram vidi.

Hab. Brazil, chiefly in Goyaz and to the northward (*Gardner*, n. 4116).

4. M. aculeatum (*Raddi, Tul. Arch. Mus. Par.* iv. p. 89; *Benth. in Mart. Fl. Bras. Leg.* ined.), stipulis demum indurato-spinescentibus,

foliolis 31–45 anguste oblongis obtusis retusisve crebre lineato-venosis nitentibus subtus pilosulis, paniculis brevibus fusco-pubescentibus, vexillo sericeo, carina alis multo breviore, staminibus isadelphis.—*Nissolia aculeata*, DC. Prod. ii. p. 258; *Drepanocarpus polyphyllus*, Benth. in Ann. Mus. Vind. ii. p. 96; *Machærium sericiflorum*, Vog. Linnæa, xi. p. 192, ex descr.—Foliola 5–6 lin. longa, coriacea, venis nonnisi subtus conspicuis. Flores semipollicares fere *Drepanocarpi ferocis*.

Hab. Brazil, chiefly near the sea, from Rio Janeiro to Pernambuco (*Gardner*, n. 965).

5. M. SPLENDENS (*Vog. Linnæa*, xi. p. 192). Stipulis demum indurato-spinescentibus, foliolis circa 19 lineari-oblongis retusis basi cuneatis subtus cæsio-nitentibus, racemis compositis, legumine incurvo cultriformi glabro.

Hab. South Brazil, *Sello*.

I have not myself seen this species, said to differ from the last chiefly by being glabrous in all its parts.

6. M. UNCINATUM (*Benth. in Ann. Mus. Vind.* ii. p. 98, et in *Mart. Fl. Bras. Leg.* ined.), stipulis parvis demum indurato-spinescentibus, foliolis 19–31 anguste oblongis obtusis retusisve glabris v. subtus minute puberulis crebre lineato-venosis, racemis lateralibus paniculatis densifloris folio brevioribus, petalis glabris, staminibus isadelphis, ovario subrecto.—*Nissolia uncinata*, Vell. Fl. Flum. vii. t. 76.—Foliola 5–7 lin. Flores 4 lin. longi.

Hab. Brazil, Rio Janeiro and Minas Geraes.

In its inflorescence and smaller flowers, this species has something of the habit of a *Dalbergia*.

7. M. ROBINIÆFOLIUM (*Vog. Linnæa*, xi. p. 182), stipulis demum indurato-spinescentibus, foliolis 19–31 oblongis obtusis mucronulatis glaberrimis, racemis axillaribus multifloris folio brevioribus, rhachi calycibusque subferrugineis, floribus glabris.—*Nissolia robiniæfolia*, DC. Prod. ii p. 258; *Machærium Sieberi*, Benth. in Ann. Mus. Vind. ii. p. 98.—Habitus et inflorescentia fere *M. uncinati*, sed racemi laxiores, minus numerosi, floribus paucioribus majoribus. Stipulæ spinescentes rectæ. Rami glabri. Foliola $\frac{3}{4}$–1-pollicaria, basi rotundata, ut in *M. uncinato* lineata, subcoriacea. Calyx subglaber. Carina subrostrata, alas subsuperans. Ovarium villosissimum. Legumen tenuiter sericeo-villosum, $1\frac{1}{2}$–2 poll. longum, 5–6 lin. latum, stipite 3 lin. longo, ad semen hinc intrusum, ala crassiuscula.

Hab. West Indies, Trinidad, *Sieber*, n. 204; St. Vincent's, *Herb. DC.*

The above character and description were made in the herbaria of Vienna and of DeCandolle. I regret that, in now working up the genus, I have not had specimens before me to compare more satisfactorily with the allied species.

8. M. PILOSUM (*Benth. in Mart. Fl. Bras. Leg.* ined.), stipulis induratis demum spinescentibus, foliolis 25–45 lineari-oblongis obtusis retusisve crebre lineato-venosis glabris puberulisve, racemis subpaniculatis brevibus rufo-pubescentibus, vexillo glabro v. vix pilosulo, carina ovarioque incurvis, staminibus monadelphis.—Folia et legumina fere *M. angustifolii.* Flores minores (vix 4 lin. longi) glabriores. Carina minus arcuata. Staminum vagina dorso integra.

Hab. North Brasil.

9. M. ERIOCARPUM (*Benth. in Ann. Mus. Vind.* ii. p. 98, *et in Mart. Fl. Bras. Leg.* ined.), stipulis demum indurato-spinescentibus, foliolis 35–75 linearibus obtusis rigidulis subparallele venulosis, racemis ramis petiolisque cano-tomentosis, vexillo glabro, carina arcuato-subrostrata, staminibus monadelphis, ovario rectiusculo.—*M. angustifolium,* Mart. Herb. Fl. Bras. n. 1111, non Vog.; *M. Martii,* Tul. Arch. Mus. Par. iv. p. 92; *Nissolia hirta,* Vell. Fl. Flum. vii. t. 78?—Foliola conferta, 3–6 lin. longa, novella cano-tomentosa demum glabrata. Flores 4 lin. longi, panicula brevi. Legumen cano-tomentosum.

Hab. Brazil, prov. Mattogrosso.

10. M. DISCOLOR (*Vog. Linnæa,* xi. p. 204), stipulis induratis demum spinescentibus, foliolis 5–7 ovatis acuminatis basi acutis glabris coriaceis nitidis crebre lineato-venosis, racemis laxe paniculatis, staminibus monadelphis, carina naviculari, ovario vix curvato.—*M. lineatum,* Benth. in Ann. Mus. Vind. ii. p. 98; *Nissolia declinata,* Vell. Fl. Flum. vii. t. 77?—Foliola bipollicaria et longiora, ultra pollicem lata. Flores vix 4 lin. longi. Legumen ignotum.

Hab. Brazil, near Rio Janeiro.

11. M. HUMBOLDTIANUM (*Vog. Linnæa,* xi. p. 198), stipulis induratis demum spinescentibus, foliolis 5–7 ovatis acuminatis basi subrotundatis glabris coriaceis nitidis creberrime lineato-venosis, racemis laxe paniculatis, staminibus subisadelphis, carina ovarioque vix arcuatis.—Valde affine *M. discolori.* Venæ foliolorum crebriores, vix anastomosantes. Flores paullo majores et forma petalorum paullulum diversi. Legumen glabrum, parte seminifera quam ala dimidio angustiore, basi acutum, longiuscule stipitatum.

Hab. New Granada, in the valley of the Araguas, *Humboldt & Bonpland*; near Caraccas, *Vargas, Linden,* n. 202.

12. M. VELLOSIANUM (*Benth. in Ann. Mus. Vind.* ii. p. 98, *et in Mart. Fl. Bras. Leg.* ined.), stipulis demum indurato-spinescentibus, foliolis 7–13 oblongo-ovatis utrinque acutiusculis coriaceis glabris lineato-venosis, paniculis puberulis, legumine glabro.—*Nissolia aculeata,* Vell. Fl. Flum. vii. t. 79, non DC.—Foliola 1–1½ poll. longa, 6–7 lin. lata.

Hab. Brasil, near Rio Janeiro.

I have only seen fruiting specimens, which differ from *M. discolor* chiefly in their smaller and narrower leaflets.

§ 2. OBLONGA.

13. M. GRACILE (*Benth. in Ann. Mus. Vind.* ii. p. 98, *et in Mart. Fl. Bras. Leg.* ined.), stipulis demum indurato-spinescentibus, foliolis 35–51 parvis oblongis obtusis mucronulatis, venulis arcuato-anastomosantibus, racemis axillaribus pedicellisque subfiliformibus, staminibus monadelphis.—Foliola 3–5 lin. longa. Racemi plerique simplices et solitarii. Pedicelli $1\frac{1}{2}$–2 lin. longi. Flores vix 4 lin.

Hab. Brazil, *Schott.*

A very distinct species in its slender inflorescence and small leaflets, which give it something of the look of an *Æschynomene*. The pod is unknown, but the flowers are quite those of *Machærium*.

14. M. NICTITANS (*Benth. in Ann. Mus. Vind.* ii. p. 98, *et in Mart. Fl. Bras. Leg.* ined.), stipulis induratis longis validis rectis spinescentibus, foliolis 11–15 parvis oblongis obtusis rigidulis subtus pubescentibus venulis arcuato-anastomosantibus, racemis leguminibusque rufo-pubescentibus.—*Nissolia nictitans*, Vell. Fl. Flum. vii. t. 75.—Foliola iis *M. scleroxyli* simillima, 10–14 lin. longa, circa 4 lin. lata.

Hab. Brazil, *Pohl.*

Only seen in fruit, and figured also in fruit by Velloso, but distinguished from all others by the straight spines, which are often above an inch long.

15. M. SCLEROXYLON (*Tul. in Arch. Mus. Par.* iv. p. 93), stipulis deciduis inerme, foliolis 11–17 parvis oblongis retusis subtus puberulis, venulis arcuato-anastomosantibus, racemis puberulis, legumine glabro.—Foliola 6–10 lin. longa, 3–4 lin. lata, fere *M. nictitantis.* Legumen ad semen non intrusum.

Hab. Brazil, prov. Minas Geraes.

This also has only been seen in fruit. It is very near the last, but has no spines, and the pod is straighter and glabrous. It appears also allied to the *Drepanocarpus floridus*, which, having as yet been only seen in flower, may prove to be a *Machærium.*

16. M. SORDIDUM (*Benth. in Mart. Fl. Bras. Leg.* ined.), inerme, foliolis 21–31 parvis anguste oblongis obtusis subtus pubescentibus venulis tenuissimis reticulatis, racemis fasciculatis rufo-pubescentibus, vexillo glabro, staminibus monadelphis.—Foliola 8–10 lin. longa, 3 lin. lata, sæpe mucronulata. Flores fere 3 lin. longi. Alæ parum arcuatæ.

Hab. Brazil, prov. Minas Geraes (*Claussen*, n. 139).

The specimens which I have seen are not good, but do not sufficiently agree with those of the *M. scleroxylon* to be considered as the flowering state of that species, although evidently allied to it.

17. M. MORITZIANUM, sp. n., inerme?, foliolis 19–25 oblongis obtusissimis retusisve venulis tenuissimis reticulato-subparallelis glabris v. minute puberulis, racemis paniculatis rufo-tomentosis, vexillo glabro, carina valde arcuata, staminibus isadelphis, legumine tomen-

tello ad semen valde intruso, dorso valde arcuato.—Stipulas delapsas non vidi. Foliola, in specimine fructifero, fere *M. ampli,* ultra pollicem longa, 4 lin. lata, in florifero 8–10 lin. longa, venis tamen quam in *Lineatis* minus conspicuis et evidentius anastomosantibus. Panicula multiflora, basi foliata. Calyx tomentosus, fere sessilis, linea paullo longior. Flos totus vix 3 lineas superans. Ovarium uti carina valde arcuatum. Legumen bipollicare v. paullo longius, crassiusculum, basi fere ut in *Drepanocarpo* curvatum, ad semen 5–6 lin. latum, ala gladiata medio 8 lin. lata.

Hab. Venezuela, *Moritzi,* n. 883 (in fruit); *Fendler coll.* 1. n. 1750 (in flower), and *coll.* 2. n. 1866 (in fruit).

I am not quite certain of having correctly matched the flowering and fruiting specimens, and I have also doubts whether the species would not be better placed near the *M. angustifolium.* It is, however, quite distinct from that species, especially in the pod, which at the base is like that of a *Drepanocarpus* on a small scale, with the long wing of *Machærium* at the end.

18. M. MYRIANTHUM (*Spruce; Benth. in Mart. Fl. Bras. Leg.* ined.), inerme, foliolis 35–51 lineari-oblongis obtusis coriaceis tenuissime reticulato-venulosis subtus paniculisque fusco-pubescentibus, panicula ampla, floribus parvis confertis, vexillo glabro, staminibus monadelphis. Foliola 8–12 lin. longa, circa 3 lin. lata. Flores vix 3 lin. longi, sessiles. Petala carinalia angusta, parum arcuata, vix connata. Legumen pubescens, basi leviter curvatum.

Hab. North Brazil? and Venezuela, near Panuré, on the Rio Uaupès, *Spruce,* n. 2758.

19. M. GOUDOTI, sp. n., inerme, stipulis linearibus deciduis, foliolis 21–35 lineari-oblongis obtusis retusisve glabris puberulisve reticulato-venulosis, racemis tomentellis, stamine vexillari subsoluto, ovario brevissime stipitato rectiusculo villosissimo, legumine pubescente.—Foliola 6–9 lin. longa, 2–3 lin. lata, primo intuitu iis *M. angustifolii* simillima; sed venatio longe diversa; venulæ enim irregulariter reticulatæ, nec parallelæ. Racemi in specimine simplices, 1–1½-pollicares. Pedicelli brevissimi. Bracteolæ ½ lin. longæ, calyci non appressæ. Calyx 1¼ lin. longus, pubescens, dentibus fere ad tertiam partem attingentibus. Petala superiora, jam delapsa, non vidi. Carina calyce vix duplo longior, latiuscule falcata, petalis longe unguiculatis dorso connatis. Staminum vagina postice integra, filamento vexillari (anthesi peracta) fere a basi soluto. Ovarium fere sessile, uniovulatum, stylo inflexo glabro. Legumen 2–2¼ poll. longum, basi 4 lin. latum, tomento rufo pubescens, ad semen intrusum, ala supra medium fere 9 lin. lata.

Hab. New Granada, at Ratata or Oratata (the name not very legible), *Goudot.*

The two specimens I have seen in DeCandolle's Herbarium are not good; but the species is evidently distinct from all others, especially in the ovary.

20. M. Gardneri (*Benth. in Mart. Fl. Bras. Leg.* ined.), inerme, foliolis 21–35 anguste oblongis obtusis mucronulatisve reticulato-venulosis subtus petiolis ramulisque villosis, panicula rufo-villosa, vexillo rufo-sericeo, staminibus monadelphis, ovario longiuscule stipitato.—*M. sericiflorum*, Gardn. in Hook. Lond. Journ. Bot. ii. p. 341, non Vog.—Foliola 1–1½ poll. longa, 4–5 lin. lata. Paniculæ subpedales, aphyllæ. Flores sessiles, fere 6 lin. longæ.
Hab. Brazil, near Rio Janeiro (*Gardner*, n. 357).

21. M. polyphyllum (*Benth. in Ann. Mus. Vind.* ii. p. 101), "foliolis 23–35 ellipticis ovatisve obtusis subtus tomentosis, inferioribus (cujusque folii) multo minoribus, floribus paniculatis, leguminibus basi et ad suturas subpubescentibus, ad alæ basin subexcisis."—*Nissolia polyphylla*, Poir.; D.C. Prod. ii. p. 258.—Foliola ½–1-pollicaria, supra glabriuscula, subtus ferrugineo-pubescentia. Paniculæ villosæ. Calyx niger, glaberrimus. Vexillum dense sericeo-villosum. Legumen adpresse pilosum, 2–2½ poll. longum, leviter incurvum, ad semen 3 lin. latum et leviter intrusum, ala medio 5 lin. lata.
Hab. Cayenne, *Patris*.

The above notes were taken in DeCandolle's Herbarium in 1853. I have not had the opportunity since then of examining the flowers, or comparing the plant with the allied species now described.

§ 3. Acutifolia.

22. M. parviflorum (*Benth. in Mart. Fl. Bras. Leg.* ined.), inerme, foliolis 17–31 parvis ovatis v. ovato-lanceolatis acutis v. obtusiusculis rigidulis tenuissime penniveniis subreticulatis minute puberulis, paniculis floribundis, floribus parvis sessilibus glabris, staminibus monadelphis, ovario longe stipitato.—Foliola 6–9 lin. longa, 3–4 lin. lata, a basi ad apicem folii decrescentia. Flores in genere minimi, vix 2½ lin. longi. Legumen ignotum.
Hab. Brazil, prov. Mattogrosso.

23. M. incorruptibile (*Allem., Benth. in Mart. Fl. Bras. Leg.* ined.), inerme, foliolis 17–23 brevissime petiolulatis lanceolatis acutis novellis subtus pubescentibus tenuissime reticulato-penniveniis, racemis paucifloris, legumine rectiusculo ad semen non intruso rufo-tomentello.—*Nissolia incorruptibilis*, Vell. Fl. Flum. vii. t. 82; *Machærium mucronatum*, Vog. Linnæa, xi. p. 191.—Foliola conferta, maxima 1 poll. longa, vix 3 lin. lata, pleraque minora. Flores non vidi. Legumen sub-3-pollicare.
Hab. Brazil, near Rio Janeiro.

24. M. firmum (*Benth. in Ann. Mus. Vind.* ii. p. 101, *et in Mart. Fl. Bras. Leg.* ined.), inerme, foliolis 21–25 (–31) oblongo-sublanceolatis obtusiusculis utrinque tomentoso-pubescentibus v. supra glabratis, panicula brevi, vexillo dense sericeo, staminibus monadelphis, legumine breviter stipitato tomentoso ad semen leviter intruso.—

Nissolia firma, Vell. Fl. Flum. vii. t. 83.—Foliola pollicaria v. maxima longiora, 4–5 lin. rarius 6 lin. lata, opaca, obtusiora quam in cæteris hujus seriei. Flores 5 lin. longi, fulvo-sericei. Legumen tomentosum, 2½–3-pollicare.

Hab. Brazil, near Rio Janeiro (*Mart. Herb. Fl. Bras.* n. 1109).

25. M. LEGALE (*Benth. in Ann. Mus. Vind.* ii. p. 101, *et in Mart. Fl. Bras. Leg.* ined.), inerme, foliolis 15–21 longiuscule petiolulatis oblongo-lanceolatis acutis supra glabris, novellis subtus petiolisque puberulis, paniculis oblongis folio brevioribus, floribus sessilibus, vexillo sericeo, staminibus monadelphis, legumine breviter stipitato rufo tomentello ad semen intruso.—*Nissolia legalis*, Vell. Fl. Flum. vii. t. 84.—Foliola 1½–2 poll. longa, 4–6 lin. lata, nitidula. Flores 5 lin. longi.

Hab. Brazil, prov. Rio Janeiro.

26. M. VILLOSUM (*Vog. Linnæa*, xi. p. 189), inerme, foliolis 17–25 oblongo- v. subovato-lanceolatis acutis subtus molliter villosis, paniculis oblongis brevibus, floribus sessilibus, vexillo sericeo, staminibus monadelphis, legumine stipitato glabro.—Foliola 2–3 poll. longa, supra sæpius glabra, acutiora quam in *M. lanato*, cui hæc species subsimilis. Flores 4 lin. longi, numerosi.

Hab. Brazil, prov. Minas Geraes and Saint Paul.

27. M. MUCRONULATUM (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 100, *et in Mart. Fl. Bras. Leg.* ined.), inerme, foliolis 11–15 ovato-lanceolatis suboblongisve acutis aristato-mucronatis basi subcordatis coriaceis subtus ramulisque pubescentibus, paniculis laxis folio brevioribus, floribus sessilibus, vexillo sericeo, staminibus monadelphis. ovario longe stipitato.—Hinc *M. acutifolio*, hinc *M. opaco* affine, Foliola 1½–2-pollicaria, rigida. Flores 4 lin. longi. Legumen non visum.

Hab. Brazil, prov. Minas Geraes and Pernambuco (*Gardner*, n. 2825).

28. M. ACUTIFOLIUM (*Vog. Linnæa*, xi. p. 187), inerme, foliolis 13–17 ovato-lanceolatis suboblongisve acutis muticis v. minute mucronulatis glabris v. subtus puberulis reticulato-penniveniis, paniculis laxiusculis folio brevioribus, floribus sessilibus, vexillo sericeo-villoso, staminibus monadelphis, legumine longe stipitato glabro.—*M. acutifolium*, Mart., Benth. in Ann. Mus. Vind. ii. p. 101; *M. muticum*, Benth. *l.c.* p. 100. —Foliola 1½–2½-pollicaria, tenuiter coriacea. Flores 4–5 lin. longi. Legumen 2–2½ poll. longum, ad semen 5 lin. latum.

Hab. Brazil, prov. Rio Janeiro, Minas Geraes and Piauhy (*Gardner*, n. 1933).

29. M. STIPITATUM (*Vog. Linnæa*, xi. p. 189), inerme, foliolis 9–15 ovato-lanceolatis suboblongisve superne angustatis obtusis subglabris, paniculis laxis folio brevioribus, floribus parvis sessilibus, vexillo pubescente, staminibus monadelphis, legumine longe stipitato glabro.—

Nissolia stipitata, DC. Prod. ii. p. 258; *Machærium minutiflorum*, Tul. Arch. Mus. Par. ii. p. 94.—Foliola 1–1½- v. fere 2-pollicaria, a medio ad apicem acutata nec acuminata, at summo apice anguste obtusa, tenuiter subcoriacea. Flores vix 3 lin. longi. Legumen sub-2-pollicare, ad semen 3–4 lin. latum.

Hab. Brazil, prov. Rio Janeiro and Minas Geraes.

§ 4. Reticulata.

30. M. leucopterum (*Vog. Linnæa*, xi. p. 189), inerme v. stipulis hinc inde breviter subulato-spinescentibus, foliolis 5–7 oblongis sub-ovatisve longe et obtuse acuminatis crebre penniveniis reticulatisque glabris v. subtus puberulis, paniculis brevibus dissitifloris, floribus sessilibus, vexillo tenuiter sericeo, staminibus monadelphis, legumine longiuscule stipitato pubescente hinc intruso, ala glabrata discolore. —*M. pungens*, Allem. Trab. Soc. Vell. p. 56.—Hinc *M. stipitato*, hinc *M. glabro* affine. Foliola 1½–2-pollicaria. Flores 3 lin. longi. Legumen 1½–2 poll. longum, basi 3–4 lin. latum.

Hab. Brazil, prov. Rio Janeiro.

31. M. glabrum (*Vog. Linnæa*, xi. p. 187), inerme, foliolis 7–9 oblongis longe et obtuse acuminatis crebre penniveniis reticulatisque glabris v. subtus puberulis, paniculis brevibus, legumine longiuscule stipitato glabro venoso ad semen vix intruso.—Specimina fructifera sola nota. Species vix a *M. leucoptero* differt legumine majore rectiore.

Hab. Brazil, *Sello.*

32. M. violaceum (*Vog. Linnæa*, xi. p. 186), inerme, foliolis 7–9 oblongis obtuse acuminatis rigidulis reticulato-penniveniis subtus petiolis ramulisque tenuissime puberulis, racemis paniculatis folio bre-vioribus tomentosis, floribus sessilibus, vexillo sericeo, staminibus monadelphis.—Foliola 1½–2½ poll. longa, 6–9 lin. lata. Flores circa 5 lin. Legumen ignotum.

Hab. South Brazil, near Rio Janeiro?

Near *M. secundiflorum*, but with narrower leaflets and larger flowers, remarkable in all the specimens I have seen by the stamens with large anthers slightly protruding from the keel.

33. M. secundiflorum (*Mart. Benth. in Ann. Mus. Vind.* ii. p. 100, *et in Mart. Fl. Bras. Leg.* ined.), inerme, ramis foliisque glabris, foliolis 3–7 ovatis v. oblongis breviter acuminatis obtusisve rigidulis concoloribus reticulato-penniveniis, racemis paniculatis folio sub-brevioribus, floribus sessilibus, vexillo sericeo, staminibus monadelphis. —*M. leiocarpum*, Vog. Linnæa xi. p. 203 ex descr.; *Nissolia lanceolata*, Vell. Fl. Flum. vii. t. 87?—Siccitate nigrescit. Foliola pleraque 2–3 poll. longa, 1–1¼ poll. lata. Flores 2½–3½ lin. longi. Legumen 1½ v. vix 2 poll. longum, ad semen 3 lin. latum, ala 5–6 lin. lata.

Hab. Brazil. Common about Rio Janeiro (*Mart. Herb. Bras.* n. 160;

Vauthier, n. 70 Hb. DC. or n. 73 Hb. Hook.). Varies considerably in the size of the leaflets and of the flower.

34. M. Salzmanni (*Benth. in Mart. Fl. Bras. Leg.* ined.), inerme, ramis foliisque glabris, foliolis 7–9 ovali-oblongis obtusis v. vix acuminatis subcoriaceis nitidis reticulato-penniveniis discoloribus, racemis brevibus subpaniculatis, floribus sessilibus, vexillo sericeo, staminibus monadelphis.—A *M. secundifloro* differt floribus majoribus (4–4½ lin. longis), legumine bi-pollicari ad semen 8 lin. lato, ala pollicem lata.
Hab. Brazil, near Bahia.

35. M. Allemani (*Benth. in Mart. Fl. Bras. Leg.* ined.), inerme, foliolis 3–7 ovatis oblongisve acuminatis tenuiter reticulato-penniveniis glabris, racemis longiusculis folio brevioribus, floribus sessilibus rufo-tomentosis (staminibus diadelphis ?), legumine longe stipitato glabro glaucescente.—*M. scleroxylon*, Allem. Trab. Soc. Vell. p. 56, non Tul.—Legumen *M. brasiliensis*; foliola majora (2–4-pollicaria) et sæpe 3 tantum.
Hab. Brazil, near Rio Janeiro.

36. M. brasiliense (*Vog. Linnæa*, xi. p. 185), inerme v. stipulis hinc inde indurato-spinescentibus, foliolis 5–9 ovatis oblongisve acuminatis, novellis pilosis, adultis glabris rigidulis concoloribus reticulato-penniveniis, racemis laxiusculis folio brevioribus, floribus subsessilibus ferrugineo-villosis, staminibus diadelphis, legumine longe stipitato glabro glaucescente.—*M. ciliatum*, Benth. in Ann. Mus. Vind. ii. p. 99; *M. Luschnathianum*, Presl, Symb. Bot. ii. p. 26, t. 73.—Foliola 1–1½-pollicaria, fere semper undulata. Flores 4 lin. longi, villosi. Legumen 2–3-pollicare, ad semen 7–8 lin. latum, ala crassiuscula 9–10 lin. lata, stipite 4–5 lin. longo.
Hab. Brazil, common near Rio Janeiro (*Mart. Herb. Bras.* n. 285).

37. M. densicomum (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 99, *et in Mart. Fl. Bras. Leg.* ined.), inerme v. stipulis hinc inde recurvo-spinescentibus, foliolis 7–9 ovatis acuminatis adultis glabris rigidulis concoloribus reticulato-penniveniis, racemis laxiusculis folio brevioribus, floribus sessilibus (villosis?), legumine longe stipitato glabro glaucescente ala discolore.—Foliola circiter pollicaria, vix undulata. Legumen pallidum, ala in sicco nigricante.
Hab. North Brazil, prov. Maranham, *Martius*.

This should probably be united as a variety with the *M. brasiliensis*; but it has a somewhat different aspect, and comes from a very different part of Brazil, and the flowers are as yet unknown.

38. M. erianthum (*Benth. in Ann. Mus. Vind.* ii. p. 99, *et in Mart. Fl. Bras. Leg.* ined.), inerme, foliolis 13–17 ovali-oblongis acuminatis adultis glabris rigidulis concoloribus reticulato-penniveniis, racemis dense paniculatis, floribus subsessilibus ferrugineo-villosis,

staminibus diadelphis.—Foliola *M. brasiliensis,* sed numerosiora. Flores 5 lin. longi, petalis calycibusque dense villosis. Legumen ignotum.

Hab. Brazil, *Pohl.*

39. M. VESTITUM (*Vog. Linnæa,* xi. p. 190), inerme, foliolis 7–13 oblongis acuminatis nitidis concoloribus reticulato-penniveniis subtus ad costam petiolis ramulisque ferrugineo-tomentosis, racemis fasciculatis folio brevioribus, floribus subsessilibus rufo-villosis, staminibus diadelphis, legumine longiuscule stipitato glabro.—Foliola 1–1½-pollicaria. Partes novellæ, fere ut in *M. oblongifolio,* rufo-villosæ v. tomentosæ. Flores 5 lin. longi, iis *M. brasiliensis* similiores.

Hab. South Brazil, *Sello, Riedel.*

40. M. TRISTE (*Vog. Linnæa,* xi. p. 416), inerme, foliolis 5–10 elliptico-ovatove-oblongis acuminatis subopacis margine subtusque et racemis dense fusco-ferrugineo-pubescentibus, racemis folio brevioribus, floribus subsessilibus subsericeis, staminibus diadelphis.

Hab. Rio Janeiro, *Luschnath.*

I have not seen this plant; but, from Vogel's detailed description, it appears to me to be scarcely distinct from the last.

41. M. OBLONGIFOLIUM (*Vog. Linnæa,* xi. p. 184), inerme v. stipulis hinc inde spinescentibus, foliolis 5, rarius 7, oblongis ovatisve obtusis v. obtuse acuminatis tenuiter reticulato-penniveniis subtus ramulisque rufo-tomentosis villosisve, racemis brevibus, floribus subsessilibus, vexillo hirsuto, staminibus monadelphis, legumine stipitato glaberrimo.—*M. verrucosum,* Vog. Linnæa, xi. p. 183; *M. villosulum,* Mart. Herb. Fl. Bras. n. 159; *M. puberulum,* Mart., Benth. in Ann. Mus. Vind. ii. p. 99; *M. heterophyllum,* Presl, Symb. Bot. ii. p. 26, t. 72.—Foliola quoad formam quam maxime variabilia, nunc omnia elliptico-oblonga 1–2-pollicaria, nunc nonnulla v. omnia ovata 2–3-pollicaria, v. parva et subcordata. Flores circa 5 lin. longi. Legumen circa 2½ poll. longum, prope basin 5 lin. latum, ad semen vix intrusum.

Hab. South Brazil, common near Rio Janeiro, and extends from San Paolo to Bahia (*Gardner,* n. 24; *Vauthier,* n. 133; *Blanchet,* n. 3777).

42. M. SEEMANNI (*Benth. in Seem. Bot. Her.* p. 110), inerme, foliolis 11–13 parvulis ovatis oblongisve obtusis subacuminatis basi rotundatis subcordatisve nitidulis pilosulis tenuissime reticulato-penniveniis, racemis brevibus confertis ferrugineo-tomentosis, floribus sessilibus rufo-sericeis (staminibus diadelphis?), legumine longe stipitato fusco-tomentoso.—Foliola ¾–1¼ poll. longa, 5–6 lin. lata, breviter petiolulata, sæpius obliqua, novella rufo-villosa, adulta præter costam glabrescentia, concoloria. Inflorescentia fere *Drepanocarpi inundati,* racemis (seu spicis) vix pollicaribus ramosis recurvis, confertifloris. Bracteolæ orbiculatæ. Flores 3½ lin. longi. Calyces uti petala molliter rufo-sericei. Stamen vexillare anthesi peracta solutum. Legumen 3-polli-

care, ad semen 5–6 lin. latum, leviter curvatum, ala falcata medio 9 lin. lata, undique fusco-tomentosum v. velutinum.

Hab. Central America, on the Volcano de Chiriqui, in Veraguas, *Seemann*; Venezuela, *Fendler*, 2nd coll. n. 1685.

43. M. PEDICELLATUM (*Vog. Linnæa*, xi. p. 202), inerme, foliolis 5–7 ovatis acuminatis reticulato-penniveniis ramulisque glabris, racemis laxis brevibus, floribus pedicellatis fulvo-sericeis, bracteolis parvis, staminibus diadelphis, ovario stipitato villoso.—*Nissolia debilis*, Vell. Fl. Flum. vii. t. 81?—A præcedentibus facile distinguitur floribus pedicello 1–1¼ lin. longo fultis. Foliola sesquipollicaria v. maxima duplo majora. Flores 5 lin. Legumen ignotum.

Hab. Brazil, near Rio Janeiro.

44. M. BRACTEATUM, sp. n., inerme, foliolis 7–11 oblongis breviter acuminatis coriaceis nitidis concoloribus reticulato-penniveniis demum glabratis, panicula ampla laxa rufo-villosa, floribus pedicellatis, bracteolis calycem æquantibus, vexillo piloso, legumine rufo-hirto breviter stipitato.—Foliola 1½–2-pollicaria, longe petiolulata. Stipulæ lanceolatæ, rigidæ, caducæ. Folia adulta undique glabrata. Panicula dense rufo-velutina, racemis elongatis divaricatis. Pedicelli fructiferi 2–3 lin. longi. Calyx 3 lin. longus, rufo-sericeus, distincte dentatus, dente infimo circa 1 lin. longo. Bracteolæ ovatæ, obtusæ, fere 4 lin. longæ, calycem includentes. Petalorum nonnisi vestigia vidi. Legumen 2½ poll. longum, ad semen incurvum, hinc introrsum, circa 6 lin. latum, ala supra medium 8–9 lin. lata.

Hab. New Granada, near the west coast, *Barclay*.

45. M. ACUMINATUM (*H. B. et K. Nov. Gen. et Sp.* vi. p. 391), inerme, foliolis 3–5 ovatis oblongisve longe acuminatis submembranaceis concoloribus reticulato-penniveniis glabris, racemis brevibus axillaribus, floribus sessilibus, vexillo fusco-pubescente, staminibus diadelphis, legumine stipitato glabro reticulato.—*Nissolia acuminata*, DC. Prod. ii. p. 258.—Pubes in partibus novellis tenuissima. Folia adulta glabrata. Foliolum terminale sub-3-pollicare, 1–1¼ poll. latum, lateralia minora, omnia in acumen longum obtusum contracta. Racemi 1–1½-pollicares, ramosi, laxiores quam in *M. Seemanni*. Flores 3–3½ lin. longi, vexillo multo minus villoso quam in *M. brasiliense* aliisque affinibus. Legumen 3-pollicare, ad semen curvatum et 6 lin. latum, ala falcata 8–12 lin. lata apice rotundata, junius adpresse puberulum, demum glabrescens, stipite 3–4 lin. longo.

Hab. Venezuela, *Humboldt & Bonpland, Fendler*, n. 1913.

β, *latifolium*, foliolis latioribus abruptius acuminatis et sæpe ex toto majoribus, legumine longiore glabriore, ala sæpius acutata.

Hab. Central America and South Mexico; Nicaragua, *Œrsted*; Xalapa, *Galeotti*; Mount Orizaba, *Broteri*, n. 1031.

46. M. LEIOPHYLLUM (*Benth. in Ann. Mus. Vind.* ii. p. 100), inerme v. stipulis breviter recurvo-spinescentibus, ramulis inflorescentiaque

viscido-puberulis, foliolis 7–9 ovatis v. elliptico-oblongis læte virentibus tenuiter penniveniis subreticulatis glabriusculis, racemis breviter paniculatis confertifloris, floribus sessilibus rufo-sericeis, staminibus monadelphis, leguminis ala breviter oblonga.—*Nissolia leiophylla*, DC. Prod. ii. p. 258; *Machærium surinamense*, Miq. Stirp. Surin. p. 21.—Habitu et foliis *Drepanocarpum cristacastrensem* refert. Foliola inter se sæpe inæqualia, terminali sub-3-pollicari, lateralibus dimidio minoribus, v. omnia 2½–3-pollicaria. Paniculæ sæpe ramosissimæ at foliis breviores et confertifloræ; undique rufo-tomentosæ. Flores 3¼–4 lin. longi. Legumen bipollicare, crasso-coriaceum, sublignosum, ad semen 9–10 lin. latum et hinc intrusum, apice in alam coriaceam vix longiorem quam latam attenuatum.

Hab. Guiana, Surinam, *Hostmann*, n. 256 & 1198; Cayenne, *Martin* and others; British Guiana, *Parker, Schomburgk*, 1st coll. n. 482, 2nd coll. n. 41; and (apparently the same species, but with rather longer and more equal leaflets) Venezuela, *Fendler*, n. 2318. These specimens are, however, not in fruit.

The species comes very near to *Drepanocarpus cristacastrensis*; but the pod being more decidedly winged, it must be placed in *Machærium*.

47. M.? Schomburgkii (*Benth. in Hook. Journ. Bot.* ii. p. 67), inerme, foliolis subquinis oblongis acuminatis coriaceis nitidis concoloribus reticulato-penniveniis subglabris, spicis fasciculatis abbreviatis ferrugineo-sericeis, floribus sessilibus imbricatis, vexillo glabro, staminibus monadelphis.—Arbor. Folia adulta præter costam glabra, sub-3-pollicaria, 1–1½ poll. lata, rigide coriacea, petiolulo brevi. Stipulæ ovatæ, striatæ, rigidæ. Spicæ floridæ 1–1½-pollicares. Bracteæ ovato-triangulares, 2 lin. longæ. Bracteolæ ovatæ, paullo breviores. Flores fere 6 lin. longi. Calyx dense rufo-sericeus, laciniis ad quartam partem attingentibus. Carinæ petala dorso imbricantia, nec connata. Ovarium sessile, rectum, villosissimum, biovulatum.

Hab. British Guiana, *Rob. Schomburgk*, 1st coll. n. 327, 2nd coll. n. 254, *Rich. Schomburgk*, n. 385; also Surinam (*Miquel in Linnæa*, xviii. p. 577).

The pod being unknown, and there being some slight discrepancies in the flowers, the genus of this plant is as yet uncertain.

48. M. opacum (*Vog. Linnæa*, xi. p. 187), inerme, foliolis 11–17 cordato-ovatis coriaceis subtus pubescentibus, petiolis inflorescentiaque molliter tomentosis, paniculis oblongis floribundis folio brevioribus, floribus sessilibus, vexillo sericeo, staminibus monadelphis, legumine stipitato glabro.—*M. campestre*, Mart., Benth. in Ann. Mus. Vind. ii. p. 100.—Foliola pleraque bipollicaria, late cordata, rigide coriacea. Flores 3–4 lin. Legumen 2–2½-pollicare, ad semen 6 lin. latum.

Hab. Brazil, prov. Minas Geraes and Goyaz.

The veins of the leaflets are very prominent on the under side, but not so regular and parallel as in the following group.

§ 5. Penninervia.

49. M. lanatum (*Tul. in Arch. Mus. Par.* iv. p. 96), inerme, foliolis 11–21 oblongis v. ovali-oblongis obtusis utrinque molliter tomentoso-villosis penniveniis, paniculis oblongis floribundis folio brevioribus, floribus sessilibus, vexillo sericeo, staminibus monadelphis.—Foliola 1½–2-pollicaria. Flores circa 4 lin. longi. Legumen non visum.

Hab. Brazil, prov. Minas Geraes.

At first sight very near the *M. villosum*; but the leaflets are downy above as well as below, and the venation is rather that of the *Penninervia*.

50. M. nigrum (*Vog. Linnæa,* xi. p. 188), inerme, foliolis 11–15 ovali-oblongis obtusis v. rarius acutiusculis supra demum glabratis subtus dense subsericeo-pubescentibus elevato-penniveniis, paniculis laxis dense tomentosis, floribus sessilibus, vexillo sericeo, staminibus monadelphis, legumine tomentoso.—*M. velutinum,* Benth. in Ann. Mus. Vind. ii. p. 100; *Nissolia fruticosa,* Vell. Fl. Flum. vii. t. 86?—Foliola 2–3-pollicaria, venis primariis supra impressis subtus prominentibus. Flores 5 lin. longi. Legumen 2-pollicare, ad semen 4 lin. latum.

Hab. Brazil, near Rio Janeiro.

51. M. Lindenianum, sp. n., inerme, foliolis 5–9 ovalibus obtusissimis retusisve supra glabris lævibus, subtus elevato-penniveniis ferrugineo-tomentellis, panicula terminali floribusque ferrugineo-tomentosis, floribus sessilibus, staminibus monadelphis.—*M. ferrugineo* valde affine et forte varietas, differt floribus multo minoribus (vix 4 lin.) subsessilibusque et foliolis obtusioribus.

Hab. Caraccas, *Linden,* n. 1647.

52. M. ferrugineum (*Pers. Syn.* ii. p. 276), inerme, foliolis 5–11 ovalibus oblongisve mucronato-acuminatis rarius obtusatis supra glabris lævibus subtus elevato-penniveniis ferrugineo-tomentosis puberulisve, panicula terminali ferrugineo-tomentosa, floribus pedicellatis rufo-tomentosis, staminibus monadelphis, legumine tomentoso.—*Nissolia quinata,* Aubl. Pl. Gui. ii. t. 297; *Nissolia ferruginea* et *N. diadelpha,* DC. Prod. ii. p. 258; *Machærium diadelphum,* Vog. Linnæa, xi. p. 182; *M. nervosum,* Vog. *l. c.* p. 186.—Foliola sæpe opposita, 3–5-pollicaria, margine sæpius recurva. Panicula pyramidata, floribunda. Flores subsemipollicares, vexillo rufo-tomentoso. Legumen 3-pollicare, ad semen 6 lin. latum.

Hab. North Brazil and Guiana (*Spruce,* n. 2900 & 3688); Surinam, *Hostmann,* n. 1304, and others; Cayenne, *Martin, Perrottet,* &c.; British Guiana, *Rob. Schomburgk,* 1st coll. n. 579, 2nd coll. n. 697 & 816, *Rich. Schomburgk,* n. 1079 & 1479.

53. M. macrophyllum (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 99, *et in Mart. Fl. Bras. Leg.* ined.), inerme v. stipulis breviter indurato-spinescentibus, foliolis 5–7 amplis ovalibus obtusis coriaceis glabris v. subtus tenuissime ferrugineo-pubescentibus crebre penniveniis,

paniculis amplis, floribus subsessilibus, vexillo sericeo, staminibus diadelphis.—Foliola 3–5-pollicaria. Panicula sæpe pedalis. Flores 5–5¼ lin. longi. Legumen non visum.

Hab. North Brazil. The Santarem plant from Spruce's collection, distributed under this name, is however a different species, *M. floribundum.*

54. M. Kegelii (*Meisn. Linnæa,* xxi. p. 257), stipulis indurato-spinescentibus, foliolis 11–15 amplis ovalibus oblongisve acuminatis coriaceis nitidis crebre penniveniis glabris, panicula terminali floribunda, vexillo sericeo.—Foliola 2–3-pollicaria.

Hab. Surinam, *Kegel,* n. 1189.

This plant is unknown to me; but, from Meisner's description, it must be very near the *M. macrophyllum,* but with more leaflets.

55. M. eriostemon (*Benth. in Mart. Fl. Bras. Leg.* ined.), inerme? foliolis 5–7 obovali-oblongis breviter acuminatis opacis subtus inflorescentiaque tenuiter sericeo-puberulis dissite penniveniis, floribus sessilibus paniculatis, vexillo sericeo, staminibus diadelphis.—Foliola 2¼–3¼-pollicaria. Flores circa 4 lin.

Hab. South Brazil, near Mandiocca, *Riedel.*

Described many years since, from a specimen belonging to the St. Petersburg Herbarium, but not now compared with the allied species, and therefore in some degree doubtful.

56. M. floribundum (*Benth. in Mart. Fl. Bras. Leg.* ined.), inerme v. stipulis breviter spinescentibus, foliolis 7–9 amplis ovali-oblongis acuminatis subcoriaceis glabris v. subtus minute puberulis dissite penniveniis, panicula ampla floribunda, petalis glabris, staminibus monadelphis.—*M. macrophyllum,* Benth. in Pl. Spr. exs., non Mart. Foliola 3–5-pollicaria. Panicula subpedalis. Flores circa 4 lin. longi. Legumen 3–4-pollicare, ad semen 9–12 lin. latum.

Hab. North Brazil and Guiana, near Santarem, *Spruce*; Cayenne, *Martin*; British Guiana, *Rob. Schomburgk,* 2nd coll. n. 108, *Rich. Schomburgk,* n. 97.

This, which I had at one time mistaken for the *M. macrophyllum,* differs in its smaller flowers with the petals quite glabrous, in the tenth stamen united with the others, and several other minor points.

β, parviflorum, floribus vix 3 lin. longis.

Hab. Eastern Peru, near Tarapoto, *Spruce,* n. 4544.

I can perceive no other difference than the smaller flowers.

Doubtful Species.

The *Nissolia dubia,* Poir., *N. microptera,* Poir., *N. retusa,* Willd., and *N. reticulata,* Lam., are all too imperfectly described to be recognized, but they are all probably synonyms to some of the *Machæria* above enumerated.

V. Drepanocarpus, *Mey.*

Flos *Machærii*. Legumen late falcatum v. fere in orbem curvatum, plano-compressum, crasso-coriaceum, apice non vel vix attenuatum, indehiscens, monospermum, sutura vexillari (seminifera) intrusa, carinali valde arcuata. Semen magnum, compressum, reniforme, radicula inflexa.—Caulis arborescens v. alte scandens. Habitu, foliis et inflorescentia *Machæriis Lineatis* v. *Reticulatis* adeo conformis, ut genera, legumine deficiente, nequaquam distinguenda.

§ 1. *Lineati.* Foliolorum venæ primariæ a costa divergentes, crebræ, parallelæ, vix anastomosantes. Stipulæ spinescentes.

1. D. lunatus. (America trop. et Africa occid.)
2. D. aristulatus. (Brasilia borealis.)
3. D. ferox. (America tropica.)
4. D. microphyllus. (America centralis.)

§ 2. *Reticulati.* Foliola reticulato-pennivenia. Armati v. inermes.

5. D. floridus. (Brasilia.)
6. D. cristacastrensis. (America tropica.)
7. D. frondosus. (Brasilia bor.)
8. D. inundatus. (America tropica.)

§ 1. Lineati.

1. D. lunatus (*G. F. W. Mey., DC. Prod.* ii. p. 420), stipulis spinescentibus, foliolis 5–11 oblongis obovatisve obtusis retusisve coriaceis lineato-venosis.—*Pterocarpus lunatus*, Linn. fil.; *Sommerfeldtia obovata*, Schum. et Thonn. Beskr. Pl. Guin. p. 331.—Foliola forma et magnitudine varia, maxima 1½-pollicaria v. paullo longiora. Panicula terminalis foliata. Flores subsessiles, 3–4 lin. longi. Vexillum sericeo-puberulum. Carina et ovarium valde incurva. Stamina monadelpha. Legumen in orbem completum curvatum, 1–1½ poll. diametro.

Hab. Tropical America and Western Africa, chiefly near the sea-shore, North Brazil, Surinam, *Hostmann*, n. 446, and others; Cayenne, British Guiana, several of the West Indian Islands, Central America, near Segovia, *Œrsted*; South Mexico, near Vera Cruz, *Galeotti*, n. 3253, *Linden*, n. 1321. Occurs also in most collections from western tropical Africa.

2. D. aristulatus (*Spruce, Benth. in Mart. Fl. Bras. Leg.* ined.), stipulis demum recurvo-spinescentibus, foliolis 11–15 oblongis apice rotundatis aristato-subpungentibus crebre subparallele venulosis, panicula floribunda pyramidata subsericeo-pubescente, staminibus monadelphis.—Habitus *D. ferocis*. Foliola 1½–2 poll. longa.

Hab. North Brazil.

The pod is unknown; but I have referred the plant to *Drepanocarpus* on account of its close affinity with the *D. ferox*.

3. D. FEROX (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 96, *et in Mart. Fl. Bras. Leg.* ined.), stipulis demum uncinato-spinescentibus, foliolis 19–35 oblongis obtusis retusisve muticis crebre subparallele venulosis, panicula floribunda fusco-pubescente, staminibus profunde isadelphis. —Foliola 1–2-pollicaria. Flores brevissime pedicellati, 5 lin. longi. Vexillum extus sericeum. Carina valde incurva. Ovarium apice curvatum. Legumen fere 2 poll. longum, 1¼ poll. latum, fere annulatum, apice tamen breviter rectum et paullulum attenuatum.

Hab. Frequent in North Brazil. Also in British Guiana, *Schomburgk*, 1st coll. n. 267, and a variety with rather smaller leaflets in Venezuela, on the Upper Casiquiare and Orenoco, *Spruce*, n. 3213.

4. D.? MICROPHYLLUS (*G. F. W. Mey., DC. Prod.* ii. p. 420), stipulis demum uncinato-spinescentibus, foliolis 15–25 oblongis obtusis tenuissime subparallele venulosis, panicula floribunda, calycibus parvis glabris, staminibus monadelphis.—Habitus *D. ferocis*. Foliola 1–1½-pollicaria, supra nitidula, subtus laxe puberula v. demum glabrata. Panicula ampla, ramosissima. Flores conferti, brevissime pedicellati, 2½–3 lin. longi. Calyx vix lineam longus. Vexillum dense rufo-sericeum.

Hab. Central America, frequent about Panama, *Hinds, Seemann, Duchassaing*, &c.

I have retained this also in *Drepanocarpus*, on account of its evident affinity with the *D. ferox*, from which it differs chiefly in the smaller flowers and leaflets, and in the sheath of the stamens not split at the back. Should the fruit prove to be that of a *Machærium*, it would range near the *M. angustifolium*.

§ 2. Reticulati.

5. D.? FLORIDUS (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 96, *et in Mart. Fl. Bras. Leg.* ined.), stipulis spinescentibus subrectis, foliolis 21–31 parvis oblongis reticulato-penniveniis subtus sericeo-pubescentibus, panicula floribunda rufo-sericea, vexillo sericeo, staminibus monadelphis.—Foliola 4–6 lin. longa, obtusa. Flores in speciminibus Bahiensibus 4 lin., in aliis 3 lin. longi.

Hab. Brazil, prov. Bahia and Rio Janeiro (*Mart. Herb. Fl. Bras.* n. 158).

The fruit is unknown; and I have great doubts whether this may not rather be a species of *Machærium*, nearly allied to *M. scleroxylon*.

6. D. CRISTACASTRENSIS (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 96, *et in Mart. Fl. Bras. Leg.* ined.), inermis, foliolis 9–15 oblongis ellipticis sublanceolatisve acutis membranaceis reticulato-penniveniis, panicula terminali ferrugineo-villosa, staminibus monadelphis, legumine reniformi falcato.—Foliola majora usque ad 3 poll. longa et pollicem lata, inferiora cujusve folii decrescentia, in sicco læte-virentia. Panicula subsemipedalis. Flores sessiles, 3–4 lin. longi. Vexillum

plus minus sericeum. Legumen 1¼-pollicare, minus incurvum quam in *D. lunato*.

Hab. Frequent in North Brazil, also British Guiana, *Robt. Schomburgk*, 2nd coll. n. 766, *Rich. Schomburgk*, n. 1495.

Closely resembles some forms of *Machærium leiophyllum*; but the pod is not at all winged. Spruce's specimens, numbered 2552, from the Rio Uaupés, have broader leaflets; and having no pods, it is impossible to say whether the plant should be referred as a variety to the *Drepanocarpus cristacastrensis*, or to the *Machærium leiophyllum*.

7. D.? FRONDOSUS (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 96, *et in Mart. Fl. Bras. Leg.* ined.), stipulis (parvis) indurato-spinescentibus, foliolis sub-7 ovatis oblongisve breviter acuminatis submembranaceis reticulato-penniveniis, panicula terminali brevi fusco-pubescente, staminibus monadelphis.

Hab. North Brazil, *Martius*.

Very near the last species and the *Machærium leiophyllum*, differing from both in the spinescent stipules. The fruit is unknown; and it remains, therefore, uncertain to which genus it should be referred.

8. D. INUNDATUS (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 96, *et in Mart. Fl. Bras. Leg.* ined.), inermis, foliolis 5–9 (rarius 3) ovatis acuminatis coriaceis nitidis tenuissime reticulato-penniveniis, racemis axillaribus brevibus confertis, vexillo dense tomentoso, staminibus monadelphis.—Frutex volubilis. Foliola glabra, 1–3-pollicaria. Racemi fasciculati, vix pollicares. Flores sessiles, 3–4 lin. longi. Legumen *D. lunati*, nisi tomento brevissimo at denso rufescens.

Hab. Tropical America, North Brazil, and Mattogrosso, Surinam, *Wullschnagel*, n. 835; Cayenne, *Martin* and others; British Guiana, *Rob. Schomburgk*, 1st coll. n. 520, 2nd coll. n. 845, or in some herbaria, 814, *Rich. Schomburgk*, n. 1454; Venezuela, on the Casiquiare, *Spruce*, n. 3178.

Doubtful Species.

D. dubius, H. B. et K., and *D. cyathiformis*, DC., are not sufficiently described to be recognizable.

D. falcatus, Miq., from Surinam, has, according to specimens transmitted by him, so exactly the foliage of *Drepanocarpus lunatus*, with detached fruits of *Dalbergia inundata*, that, unless he has seen specimens with the fruits attached, we cannot but conclude there must have been some mismatching.

In Coulter's Mexican collection there is a flowering specimen with numerous small rigid leaves, from Bolaños, which appears to me to be an undescribed *Drepanocarpus* or *Machærium*; but without further materials, I feel unwilling to attempt to publish it.

VI. Tipuana, *Benth.*

Calyx turbinato-campanulatus, truncato-5-dentatus v. subbilabiatus. Carinæ petala dorso imbricantia v. leviter connata. Stamina monadelpha, vagina hinc fissa, v. vexillare solutum. Antheræ versatiles. Stylus basi dilatatus. Ovarium uni- v. pauciovulatum. Legumen stipitatum, samaroideum, indehiscens, basi crasso-convexum ovatum, 1–3-spermum, superne productum in alam cultriformem transverse venosam hinc styli basi persistente incrassato-marginatam. Semen solitare v. 2 subcontigua isthmo duro separata, oblique oblonga, transversa, subincurva, radicula brevi conica curvata.—Arbores speciosi, inermes. Folia impari-pinnata, foliolis plerisque alternis exstipellatis. Paniculæ terminales, laxe ramosæ. Bracteolæ subnullæ. Flores speciosi, lutei v. pallide purpurascentes.

1. T. macrocarpa (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 5–7 late-ovatis retusis subcordatis coriaceis reticulato-venosis, vexillo late ovato, alis oblongis carina minoribus, legumine lævi.—*Machærium macrocarpum,* Benth. in Hook. Journ. Bot. ii. p. 67; *Andira cinerascens,* Mart. Herb. Fl. Bras. n. 1156.—Foliola $1\frac{1}{2}$–2-pollicaria, adulta glabra et nitida. Panicula semipedalis, laxiflora. Flores lutei, 8–9 lin. longi. Legumen cum ala 3–$3\frac{1}{2}$-pollicare, 1 poll. latum.

Hab. Brazil, prov. Ceara (and Bahia?) (*Gardner*, n. 1539).

2. T. heteroptera (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 11–13 ovali-oblongis acutis penniveniis margine subdenticulatis, vexillo late orbiculato, alis oblongis carina paullo majoribus, legumine lævi. —*Machærium heteropterum,* Allem. in Trab. Soc. Vell. p. 4 cum ic. —Foliola 2–3-pollicaria. Corolla dilute purpurascens, petalis basi lutescentibus.

Hab. Brazil, prov. Rio Janeiro.

I have not seen any specimens; but it is very fully described and figured by Allemão in the work above quoted.

3. T. speciosa (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 11–21 oblongis emarginatis membranaceis subparallele venulosis integerrimis, vexillo late orbiculato, alis latissime ovatis carina multo majoribus, legumine venoso.—*Machærium Tipu,* Benth. in Kew Journ. Bot. v. p. 267, in adnot.—Foliola subsesquipollicaria. Panicula brevis, laxiflora. Flores lutei. Calyx 5 lin., corolla duplo longior.

Hab. Eastern Bolivia, prov. Porana, *Tweedie*; prov. Tomina, *Weddell*; and a variety with more numerous and rather smaller leaflets near Mizque in Bolivia, *D'Orbigny*, n. 912.

VII. Platypodium, *Vog.*

Callisemæa, *Benth.*

Calyx turbinato-campanulatus, 5-dentatus, subbilabiatus. Vexillum amplum. Carinæ petala dorso apice connata. Stamina 2 (vexillare et

carinale) libera, cætera in phalanges 2 tetrandras coalita. Antheræ versatiles. Ovarium pluriovulatum. Legumen stipitatum, samaroideum, indehiscens, apice lignosum, 1–2-spermum, basi in alam oblongam oblique venosam attenuatum. Arbores speciosæ, inermes. Folia impari- v. abrupte pinnata, foliolis alternis v. irregulariter oppositis exstipellatis. Racemi in axillis superioribus laxi. Flores lutei.

1. P. GRANDIFLORUM (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 8–14 glabris v. subtus tenuissime puberulis, racemis elongatis laxis, vexillo latissimo profunde emarginato, alis oblique obovatis.—*Callisemæa grandiflora,* Benth. in Ann. Mus. Vind. ii. p. 105.—Foliola subpollicaria, crebre parallele venulosa. Racemi 3–6-pollicares. Calyx 5–6 lin. longus.
Hab. Brazil, *Pohl.*

2. P. ELEGANS (*Vog. Linnæa,* xi. p. 422), foliolis 10–20 subtus petiolis ramulisque pubescentibus, racemis folio brevioribus, vexillo subintegro, alis oblongis.—*Callisemæa sericea,* Benth. in Ann. Mus. Vind. ii. p. 105. —Foliola iis *P. grandiflori* nunc minora nunc majora, rigidiora. Racemi et pedicelli breviores. Flores minores. Legumen cum ala 2¼–3 poll. longum.
Hab. Brazil, prov. Minas Geraes, Goyaz, Piauhy, and Bahia (*Gardner,* n. 2140 & 3655; *Blanchet,* n. 2790).
β, *major,* foliolis floribusque majoribus.—*Platypodium viride,* Vog. Linnæa, xi. p. 420; *Callisemæa pubescens,* Benth. in Ann. Mus. Vind. ii. p. 105.
Hab. Brazil, prov. Minas Geraes and Goyaz.

VIII. CENTROLOBIUM, *Mart.*

Calyx late campanulatus, basi obtusus, semi-4-fidus. Carinæ petala dorso apice connata. Stamina monadelpha, vagina latere superiore fissa. Antheræ versatiles. Ovarium sub-3-ovulatum. Legumen subsessile, ample samaroideum, indehiscens, basi crasso-coriaceum echinatum, superne in alam falcato-oblongam productum, stylo ad basin alæ laterali calcariformi. Semina 1–3, subcontigua, isthmis transversis sublignosis separata.—Arbores Americanæ, inermes. Folia ampla, impari-pinnata, foliolis irregulariter oppositis alternisque exstipellatis. Paniculæ terminales, amplæ. Pedicelli solitarii. Flores mediocres (albo-violacei ?), petalis glabris, calyce ferrugineo.

1. C. ROBUSTUM (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 95, *et in Mart. Fl. Bras. Leg.* ined.), foliolis 13–17 ovato-oblongis basi oblique rotundatis supra puberulis subtus glabris resinoso-punctatis intra venas tenuissime venulosis, legumine longe echinato stylo adscendente.—*Nissolia robusta,* Vell. Fl. Flum. vii. t. 85; *Centrolobium minus,* Presl, Symb. Bot. ii. p. 26, t. 74.—Foliola 3–5-pollicaria. Panicula

$\frac{1}{2}$–1-pedalis. Calyx 5–6 lin. longus. Petala vix dimidio longiora. Legumen cum ala 6–8 poll. longum.

Hab. Brazil, near Rio Janeiro.

2. C. TOMENTOSUM (*Benth. in Hook. Journ. Bot.* ii. p. 66, *et in Mart. Fl. Bras. Leg.* ined.), foliolis 13–17 ovatis oblongisve basi oblique truncato-subcordatis supra pubescentibus subtus ferrugineo-tomentosis inter venas transverse venulosis, legumine breviter echinato, stylo adscendente.—Foliola quam in præcedente sæpius latiora et submajora. Leguminis ala latior, spinæ breviores.

Hab. Brazil, prov. Minas Geraes and San Paulo.

3. C. PARAENSE (*Tul. in Arch. Mus. Par.* iv. p. 87), foliolis 7–13 late subcordato-ovatis membranaceis utrinque petiolis paniculisque ferrugineo-villosis, legumine longe echinato, stylo patente v. recurvo.—Stipulæ latæ, semipollicares, membranaceæ, diutius persistentes quam in præcedentibus. Foliola latiora, venis primariis subtus valde prominentibus, transversis tenuibus. Panicula quam in *C. tomentoso* minus ramosa. Legumen 7–8-pollicare.

Hab. North Brazil, in British Guiana in the Roraima district, *Rob. Schomburgk*, 2nd coll. n. 314; *Rich. Schomburgk*, n. 590. Also, apparently the same species, but with more glabrous and less decidedly cordate leaflets, near Angostura in Venezuela, *Purdie.*

IX. PTEROCARPUS, *Linn.*

Amphymenium, *H. B. et K.*, Echinodiscus, Moutouchia *et* Phellocarpus, *Benth.*, Ancylocalyx, *Tul.*

Calyx turbinato-campanulatus, basi acutus, sæpius incurvus, 5-dentatus, subbilabiatus. Carinæ petala dorso apice breviter connata v. sublibera. Stamina 10, nunc monadelpha vagina latere superiore fissa, nunc vagina utrinque fissa isadelpha, v. stamine vexillari soluto diadelpha $\frac{1}{9}$. Antheræ versatiles. Ovarium 2–6-ovulatum. Legumen compressum, indehiscens, orbiculatum v. ovatum, plus minus obliquum v. falcatum, stylo laterali v. rarius terminali, medio seminifero plus minus induratum v. incrassatum, circumcirca attenuato-alatum v. carinatum, nunc fere totum attenuato-coriaceum v. membranaceum. Semina 1–3, isthmis duris separata.—Arbores utriusque orbis inermes. Folia alterna, impari-pinnata. Foliola alterna v. irregulariter opposita, exstipellata. Racemi simplices v. laxe paniculati. Flores lutei, rarius albidi violaceo mixti, sæpius speciosi. Petala glabra.

§ 1. *Ovario stipitato.*

* *Legumine subovali subrecto.*

1. P. lucens. (Africa tropica.)
2. P. sericeus. (Africa austr.-occid.)

** *Legumine suborbiculato acumine (stylo) valde laterali.*

3. P. erinaceus. (Africa tropica.)
4. P. echinatus. (Africa tropica.)
5. P. santalinus. (Peninsula indica.)
6. P. Marsupium. (Peninsula indica, Ceylona.)
7. P. indicus. (India austr., Archipelagus, China austr.)
8. P. Draco. (America tropica.)

§ 2. *Ovario sessili.*

9. P. esculentus. (Africa occid., Cayenna?)
10. P. Rohrii. (America tropica.)
11. P. violaceus. (Brasilia.)
12. P. rufescens. (Peruvia orient.)
13. P. ancylocalyx. (Brasilia sept.)
14. P. villosus. (Brasilia.)
15. P. amphymenium. (Mexico.)

1. P. LUCENS (*Lepr. in Guill. et Perr. Fl. Seneg.* i. p. 228), glaber v. minute glauco-sericeus, foliolis 3–5 ovatis oblongisve longe petiolulatis, racemis simplicibus, pedicellis calyce multo longioribus, stamine vexillari soluto, ovario stipitato villosulo biovulato, legumine stipitato obovato-suborbiculari glaucescente ala coriacea.—*P. abyssinicus*, Hochst., A. Rich. Fl. Abyss. i. p. 233. t. 45.—Totus glaucescit. Foliola 1½–2-pollicaria, obtusissima v. breviter et obtuse acuminata, supra nitidula, reticulato-venulosa. Racemi semipedales. Pedicelli 4–6 lin. longi. Vexillum vix margine crispulum. Carinæ petala dorso contigua at sæpius distincta. Legumen circa 1½ poll. longum, 1 poll. latum, stylo subterminali, membranaceo-coriaceum, medio plus minus incrassatum, stipite 3–5 lin. longo.

Hab. Tropical Africa, in Senegambia and Abyssinia.

2. P. SERICEUS, sp. n., foliolis 3–5 late ovatis subtus v. utrinque sericeo-nitentibus, legumine breviter stipitato ovato-suborbiculari ala coriacea.—Specimen fructiferum. Partes novellæ dense sericeo-nitentes. Stipulæ inferiores oblongæ semipollicares, superiores lineares. Foliola bipollicaria, adulta supra glabrata nitida et insigniter reticulata, subtus sericeo-pubentia. Flores non vidi. Legumen fere *P. lucentis*, sed brevius stipitatum.

Hab. South Africa, on the Hex River and the Aapges River, *Burke*.

3. P. ERINACEUS (*Poir., DC. Prod.* ii. p. 419; *Guill. et Perr. Fl. Seneg.* p. 229. t. 54), foliolis 11–15 ovali-oblongis obtusis v. emarginatis subtus tomentosis, racemis paniculatis tomentosis, staminibus monadelphis diadelphisve ½, legumine breviter stipitato suborbiculato stylo laterali medio echinato margine late membranaceo.—*P. Adansonii*, DC. Prod. ii. p. 419.—Specimina quæ vidi florida leguminibusve junioribus prædita foliis orbata sunt. Foliola ex icone et descr.

Guilleminii supracitatis 2–3-pollicaria, novella subtus rufo-sericea, adulta subtus brevissime et dense tomentosa, obtusiora quam in sequente et minime acuminata. Legumen circa 2 poll. diametro, molliter tomentosum.

Hab. Tropical Africa, Senegambia, *Leprieur, Heudelot*, n. 47 and 628.

4. P. echinatus (*Pers.? DC. Prod.* ii. p. 419?), foliolis 11–15 ovatis oblongisve breviter et obtuse acuminatis glabris v. subtus minute puberulis, racemis paniculatis tomentellis, staminibus diadelphis $\frac{1}{9}$, legumine stipitato suborbiculato medio echinato margine late membranaceo stylo laterali.—*P. angolensis*, DC. Prod. ii. p. 419?—Foliola 2–3-pollicaria v. ramorum sterilium 4-pollicaria, nunc exacte ovata et basi subcordata, nunc elongato-oblonga, supra medium angustata, supra glabra nitida, subtus pubescentia, crebre parallele venosa et reticulato-venulosa. Rami floridi aphylli. Racemi laxi, 3–4-pollicares, minus tomentosi quam in præcedente. Pedicelli 2–3 lin. longi, bracteolis subulatis a calyce subdistantibus. Flores semipollicares, lutei. Petala crispula, carinalia vix connata. Ovarium brevissime stipitatum, biovulatum. Legumen 2–2½ poll. diametro, brevius longiusve stipitatum, tomentellum, medio setis longis rigidis echinatum, acumine (stylo) medium versus lateris superioris sursum v. deorsum spectans.

Hab. Western Tropical Africa, on the Niger, a common tree in the interior, where it is known under the name of "Cornwood," *Barter*.

It is probably a mere variety of *R. erinaceus* with more glabrous leaflets somewhat differently shaped, but I have not myself seen the leaves of the true *erinaceus* to compare.

5. P. santalinus (*Linn. fil., DC. Prod.* ii. p. 419), foliolis subternis (rarius 4–5) late ovatis emarginatis v. orbiculatis, racemis axillaribus ramosis, "stamine vexillari libero cæteris diadelphis $\frac{4}{5}$" legumine longe stipitato oblique orbiculato medio incrassato inermi margine attenuato, stylo laterali.—Valde affinis *P. Marsupio*, differt imprimis foliolis latioribus et sæpissime 3 tantum.

Hab. East Indian Peninsula, *Wight, Heyne* (*Wall. Cat.* n. 5844).

Of this we have but very few very indifferent specimens, and I have not myself been able to examine the flowers.

6. P. Marsupium (*Roxb. Pl. Corom.* ii. t. 116; *DC. Prod.* ii. p. 418), foliolis 5–7 (rarius 3) oblongis obovatisve retusis emarginatis v. vix acuminatis, racemis paniculatis, staminibus monadelphis v. demum isadelphis, legumine breviter stipitato oblique orbiculato tomentello medio incrassato venoso inermi margine late attenuato, stylo laterali. —*P. bilobus*, Roxb., G. Don., Gard. Dict. ii. p. 376.—Foliola 2–3- v. rarius 4-pollicaria, coriacea, nitida, crebre subparallele venosa, fere semper apice late rotundata et emarginata, rarissime breviter et obtuse subacuminata, glabra v. subtus minute puberula. Panicula laxe ramosa, folia vix superans, tenuissime fusco-tomentosa. Flores brevissime pedicellati, semipollicares. Petala lutea, margine crispula.

Ovarium breviter stipitato-biovulatum. Legumen 1½ v. rarius 2 poll. diametro.

Hab. East Indian Peninsula, apparently frequent, occurring in most collections (*Wall. Cat.* n. 5842); also in Ceylon, *Walker, Thwaites, C. P.* n. 1495; and in Central India, on the Waree Hills below Munghyr, *Madden* (a variety with less obtuse leaves and a broader pod), approaching the *P. indicus.*

7. P. INDICUS (*Willd., DC. Prod.* ii. p. 419), foliolis 7–9 (rarius plurimis) ovatis acuminatis, racemis subramosis summis paniculatis, staminibus monadelphis demum isadelphis (vexillari rarius soluto) legumine stipitato oblique suborbiculato tomentello medio incrassato venoso inermi margine late attenuato stylo laterali.—*P. dalbergioides,* Roxb. Fl. Ind. iii. p. 236; *P. Wallichii,* W. et Arn. Prod. Fl. Pen. i. p. 267; *P. santalinus,* Blanco Fl. Filip. p. 561 non Linn.; *P. Zollingeri,* Miq. Fl. Ned. Ind. i. p. 136 ex char.—Foliola 2–3 pollicaria minus coriacea et venis magis reticulatis quam in *P. Marsupio,* pariter glabra v. subtus minute puberula. Racemi laxiores pedicellis 2–3 lin. longis. Legumen sæpius fere 2 poll. diametro, cæterum ei *P. Marsupii* simile.

Hab. Southern India and the Archipelago (*Wall. Cat.* n. 5845). In the Peninsula, *G. Thomson, Law*; Martaban, *Wallich*; Moolmyne, *MacLelland*; Mergui and Malacca, *Griffith*; Penang, *Wallich*; Andaman Islands (*Wall. Cat.* n. 5843); Sumatra, *Zollinger,* n. 3055; Java, *Perrottet, Junghuhn*; Philippine Islands, *Cuming,* n. 1227; South China, *Millett, Beechey.*

The *P. flavus,* Lour., and *P. obtusatus,* Miq., both from the Archipelago, and described by Miquel (*Fl. Ned. Ind.* i. p. 136) from very insufficient materials, have nothing in the characters given to distinguish them from the common *P. indicus.*

8. P. DRACO (*Linn. ex parte, DC. Prod.* ii. p. 418), glaberrimus, foliolis 5–9 ovatis oblongisve acuminatis nitidis, racemis paniculatis, staminibus monadelphis v. demum isadelphis, legumine stipitato valde obliquo suberoso-incrassato venoso margine præsertim exteriore attenuato stylo laterali.—*P. officinalis,* Jacq. Pl. Amer. t. 183. f. 92? (ex icone vix recognoscendo); *Moutouchi suberosa,* Aubl. Pl. Gui. ii. p. 748. t. 299; *P. suberosus,* Pers. Syn. Pl. ii. p. 277; *P. crispatus,* Fl. Mex. in DC. Prod. ii. p. 418?—Species glabritie inflorescentiæ leguminis et omnium partium a cæteris omnibus distinguitur. Foliola 2–4-pollicaria, coriacea, venis primariis subdistantibus retique venularum utrinque conspicuis. Paniculæ laxæ, breves. Calyx nigrescens, valde obliquus. Legumen 1¼ poll. diametro.

Hab. Tropical America, Nicaragua in Central America, *Œrsted*; Guadaloupe, *Duchassaing*; Cayenne, *Martin*; Surinam, *Hostmann,* n. 381.

9. P. ESCULENTUS (*Schum. et Thonn. Beskr. Pl. Guin.* p. 330), foliolis 5–9 ovatis oblongisve acuminatis nitidis glabris, racemis simplicibus brevibus tomentosis, floribus subsessilibus, ovario sessili tomentoso, legumine sessili valde obliquo suberoso-incrassato rugoso margine exteriore attenuato, stylo laterali.—*P. santalinoides,* Lher. in DC. Prod. ii. p. 419?—Arbor parva, folia omnino *P. Rohrii,* foliola variant nunc pleraque 4 poll. longa, 2 poll. lata petiolo semipedali, nunc omnia dimidio minora, nunc in ramis sterilibus 4–6-pollicaria petiolo pedali. Racemi breviter pedunculati, 1–2-pollicares, densiflori, v. rarius semipedales laxioresque. Bracteolæ subulatæ, calyce breviores. Flores omnino *P. Rohrii,* pedicellis tamen brevissimis. Ovula 6. Legumen fere *P. Draçonis* sed arcte sessile, et magis incrassatum et sæpius tomentellum.

Hab. West tropical Africa, where it is frequent, in Senegambia, *Heudelot*; Sierra Leone, *Oldfield*; on the Niger and Quorra, *Vogel, Barter.* Also Cayenne, from a fruiting specimen among *Martius'* plants, but perhaps introduced there by the negroes, who eat the seeds.

10. P. ROHRII (*Vahl., DC. Prod.* ii. p. 418), foliolis 5–9 ovatis oblongisve acuminatis nitidulis glabris, racemis simplicibus subramosisve tomentosis, pedicellis calyce brevioribus, ovario sessili tomentoso, staminibus monadelphis, legumine suborbiculato late membranaceo medio reticulato vix incrassato, stylo laterali.—*Amphymenium Rohrii,* H. B. et K. Nov. Gen. et Sp. vi. p. 380 in adnot.; *Phellocarpus floridus,* Benth. in Ann. Mus. Vind. ii. p. 106.—Foliola valde variabilia, nunc omnia ovata subcordata vix bipollicaria nunc, late v. anguste oblonga 3–5-pollicaria. Racemi longiores et laxiores quam in *P. esculento,* densiores et sæpius longiores quam in *P. violaceo* et *P. rufescente.* Legumen circa 2 poll. diametro.

Hab. Tropical America, North Brazil; Cayenne, *Martin*; British Guiana, *Parker, Rob. Schomburgk,* 1*st coll.* n. 34, 2*nd coll.* n. 222 and 459, *Rich. Schomburgk,* n. 136 and 733; Venezuela, *Funcke & Schlimm,* n. 585.

I have seen many Cayenne specimens, but mostly in flower only, and some of these may possibly be referrible to the *P. esculentus.*

11. P. VIOLACEUS (*Vog. Linnæa,* xi. p. 416), foliolis 5–7 ovatis subcoriaceis nitidulis glabris, racemis simplicibus, pedicellis calyce tomentoso longioribus, vexillo late maculato, staminibus monadelphis, ovario sessili tomentoso, legumine obovali-orbiculari late coriaceo-attenuato medio subreticulato, stylo excentrico.—*Phellocarpus laxiflorus,* Benth. in Ann. Mus. Vind. ii. p. 106; *Pterocarpus cultratus,* Vell. Fl. Flum. vii. t. 95? et *Nissolia reticulata,* Vell. *l. c.* t. 88?—Folia fere *P. Rohrii,* differt pedicellis 4–5 lin. longis et legumine minus dilatato ala crassiore coriacea nec membranacea.

Hab. South Brazil, near Rio Janeiro, whence it is frequently sent, but

I have seen the fruit only on A. Cunningham's specimens in the British Museum.

β? *angustifolia*, foliolis 2–3 poll. longis 6–9 lin. latis, pedicellis brevioribus.

Hab. Brazil, prov. Bahia, *Blanchet*, n. 3785.

This may very possibly prove to be a distinct species when the pod becomes known.

12. P. RUFESCENS, sp. n., foliolis 7–9 ovatis oblongisve acuminatis subtus ad venas petiolisque rufo-tomentosis, racemis simplicibus calyce tomentoso longioribus, vexillo late maculato, staminibus monadelphis, ovario sessili tomentoso, legumine suborbiculato late membranaceo medio reticulato vix incrassato, stylo laterali.—Primo intuitu *P. violaceo* simillimus. Inflorescentia et flores eadem. Foliola basi obtusiora, subtus uti petioli tomento brevi rufescentia, et legumen omnino *P. Rohrii*, a quo differt pube et pedicellis elongatis.

Hab. Eastern Peru, on the banks of the Mayo, near Tarapoto, *Spruce*, n. 4471.

13. P. ANCYLOCALYX (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 9–11 oblongis subobovatisve acuminatis nitidulis glabris, racemis simplicibus tomentellis, pedicellis brevissimis, ovario sessili tomentoso, legumine ex oblongo suborbiculari plano coriaceo lævi, stylo subterminali.—*Phellocarpus acutus*, Benth. in Ann. Mus. Vind. ii. p. 106? *Ancylocalyx acuminata*, Tul. in Ann. Sc. Nat. Par. 2 ser. xx. p. 137, t. 2, et in Arch. Mus. Par. iv. p. 74; *Amphymenium longifolium*, Benth. Pl. Spr. exs.—Florifer a *P. Rohrii* parum differt, foliolis numerosioribus angustioribus, floribus brevius pedicellatis, calyce magis incurvo laciniis summis acutioribus. Legumen valde diversum, undique coriaceum et crassiusculum v. margine exteriore anguste coriaceo-attenuatum, nunc vix longius quam latum, nunc plane oblongum.

Hab. North Brazil.

14. P. VILLOSUS (*Mart., Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis subquinis ovatis acuminatis supra puberulis subtus ramulisque villosulis, racemis abbreviatis, legumine orbiculato late membranaceo medio reticulato, stylo laterali.—*Amphymenium villosum*, Mart., Benth. in Ann. Mus. Vind. ii. p. 95.—Foliola 1½–2-pollicaria, non nitida. Flores non vidi. Racemi fructiferi perbreves. Legumen forma *P. Rohrii*, sed tenuiter villosulum.

Hab. Brazil, prov. Bahia.

15. P. AMPHYMENIUM (*DC. Prod.* ii. p. 418), foliolis 7 ovato-ellipticis acutis supra glabris subtus pubescentibus, racemis simplicibus albido-tomentosis, staminibus monadelphis, ovario sessili sericeo, legumine obovato-orbiculari albido-tomentoso late membranaceo medio tumido.—*Amphymenium pubescens*, H. B. et K. Nov. Gen. et Sp. vi. p. 380.

Hab. Mexico, between Zumpango and Mescala, *Humboldt* and *Bonpland*.

When I saw Humboldt's specimen at Paris in 1857, it appeared to me quite distinct from the *P. villosum*; but I have not had the opportunity of carefully comparing it.

Among the species enumerated by DeCandolle or subsequent writers under *Pterocarpus*, the *P. sapindoides*, DC., is an *Andira*; *P. Peltaria*, DC., is *Viborgia fusca*; the rest of his section *Ateleia* forms a new genus under that name among *Cæsalpinieæ*; *P. australis*, Endl., is a *Millettia*; *Amphymenium mediterraneum*, Mart., is a *Martia*.

X. Pœcilanthe, *Benth.*

Calyx turbinato-campanulatus, basi acutus, semi-4-fidus. Carina alis brevior, petalis dorso apice connatis. Stamina monadelpha, vagina latere superiore fissa. Antheræ versatiles. Ovarium pluriovulatum. Legumen (lineare v. oblongum compressum indehiscens?) stylo terminali, seminibus pluribus dissitis.—Arbores Austro-Americanæ. Folia alterna, impari-pinnata. Foliola alterna, stipellis nullis v. parvis ad foliolum terminale. Racemi simplices, breves, axillares v. laterales. Bracteolæ parvæ. Pedicelli sparsi. Flores lutei v. albidi rubro v. violaceo mixti. Petala glabra.

1. P. grandiflora (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 5–7 ovatis oblongisve acuminatis basi rotundato-subcordatis subtus petiolisque pubescentibus, floribus majusculis.—*Pterocarpus falcatus*, Vell. Fl. Flum. vii. t. 93?—Foliola bipollicaria, v. terminale subtripollicare, petiolulata. Racemi bipollicares, laxi. Calyx 4 lin. longus. Ovarium glaberrimum.

Hab. Brazil, prov. Minas Geraes.

2. P. subcordata (*Benth. l. c.*), foliolis subseptenis late cordato-ovatis acuminatis glabris brevissime petiolulatis, floribus parvis.—Foliola 1–1½-pollicaria. Racemi 1–1½-pollicares, laxiores quam in *P. parviflora*. Flores 4 lin. longi, calyx 2–2½ lin. Ovarium ad suturas pilosulum.

Hab. Brazil, prov. Minas Geraes.

3. P. parviflora (*Benth. l. c.*), foliolis subquinis ovatis oblongisve acuminatis basi angustatis rotundatisve longiusque petiolulatis glabris, floribus parvis, pedicellis brevissimis.—Foliola 1–1½-pollicaria v. rarius bipollicaria, basi sæpius contracta. Racemi vix pollice longiores, a basi dense floridi. Flores 3–3½ lin. longi, lutei rubro mixti. Carina subrostrata. Ovarium pilosulum, ovulis 4.

Hab. On the Uruguay, where it becomes a tree of great beauty, called by the natives "*Lapotchillo*," or "the *little Lapotcho*," according to Tweedie.

XI. Platymiscium, *Vog.*

Calyx breviter 5-dentatus. Alæ liberæ. Carinæ petala dorso superne connata. Stamina monadelpha, vagina latere superiore fissa, v. vexillare rarius ad basin solutum. Antheræ versatiles. Ovarium stipitatum, uni-

ovulatum. Legumen stipitatum, oblongum, planum, indehiscens, submembranaceum, ad semen non incrassatum, suturis tenuibus v. vix nerviformi-incrassatis. Semen magnum reniforme, plano-compressum, radicula inflexa. Caulis lignosus arboreus v. frutescens. Folia opposita, v. 3–4-natim verticillata, glaberrima; foliolis oppositis paucijugis cum impari distante. Stipellæ nullæ. Racemi ad axillas foliorum novellorum solitarii et simplices terni v. trifidi, ad nodos vetustiores sæpe subfasciculati. Bracteæ et bracteolæ parvæ. Pedicelli sparsi. Flores lutei, glabri.

* *Foliola* 3.

1. P. hebestachyum. (Nov. Granada.)
2. P. parviflorum. (America centralis.)
3. P. trifoliolatum. (Mexico.)

** *Foliola 5. Racemi rhachis pubescens.*

4. P. Trinitatis. (Ins. Trinitatis.)
5. P. stipulare. (Peruvia orient.)

*** *Foliola 5, rarius 7–9. Racemus glaber. Calyx brevis basi obtusus.*

6. P. gracile (Racemi rhachis subpubescens). (Peruvia orient.)
7. P. filipes. (Cayenne.)
8. P. præcox. (Brasilia.)
9. P. polystachyum (Calyx basi subattenuatus). (Venezuela.)

**** *Foliola 5 v. 7. Racemus glaber. Calyx longior basi attenuatus.*

10. P. Blancheti. (Brasilia.)
11. P. floribundum. (Brasilia.)
12? P. speciosum. (Brasilia.)
13. P. nitens. (Brasilia.)

1. P. HEBESTACHYUM, sp. n., foliolis 3 ovatis basi truncatis subcordatisve, racemis cano-pubescentibus, pedicellis abbreviatis, vexillo alis breviore.—Ramuli et folia, ut in omni genere, glabra. Foliolum terminale 4 poll. longum, 3 poll. latum, lateralia multo minora, omnia breviter et obtuse acuminata, coriacea, nitida. Racemi numerosi, longiores 3-pollicares. Pedicelli subfasciculati, 1½ lin. longi. Bracteolæ ovatæ, 1 lin. Flores 4–5 lin. Calyx glabrescens, dentibus brevibus obtusis. Vexillum alis paullo brevius, orbiculatum. Stamen vexillare liberum v. ad medium cum cæteris connatum. Ovarium glabrum, longe stipitatum. Legumen non visum.

Hab. New Granada, near Tocaima, *Holton*, n. 993.

2. P. PARVIFLORUM, sp. n., foliolis 3 ovatis acuminatis basi acutis v. rotundatis, racemis puberulis, floribus parvis subsessilibus, vexillo alas superante.—Foliolum terminale 3–4 poll. longum, circa 2 poll. latum, lateralia paullo minora, omnia tenuiter coriacea, nitidula, petiolulo 2 lin. longo. Racemi subfasciculati, bipollicares. Pedicelli etiam fructiferi vix ½ lin. longi. Bracteolæ ovatæ, caducissimæ. Flores 4 lin.

longi. Calyx vix 1½ lin., basi obtusus, dentibus brevibus obtusis. Vexillum suborbiculatum. Stamen vexillare liberum. Ovarii stipes quam in affinibus brevior. Legumen (vix maturum) 3 poll. longum, 1 poll. latum, stipite vix 2 lin. longo.

Hab. Central America, between Granada and Nicaragua, *Œrsted.*

3. P. TRIFOLIOLATUM (*Benth. in Herb. Trin. Coll. Dubl. MS.*), foliolis 3 ovato-ellipticis acuminatis basi acutis, racemis glaberrimis, floribus longiuscule pedicellatis.—Foliola quam in præcedente paullo angustiora, petiolulo duplo longiore. Racemi 3–5-pollicares, laxiflori. Pedicelli sparsi, 3 lin. longi. Flores 5–6 lin. longi. Calyx brevis, dentibus brevibus acutiusculis. Vexillum orbiculatum, alis subbrevius. Stamen vexillare liberum. Legumen junius tantum vidi 1½ poll. longum, 4 lin. latum, stipite 4 lin. longo.

Hab. Mexico, between San Blas and Guadalaxara, *Coulter.*

4. P. TRINITATIS, sp. n., foliolis subquinis ovalibus oblongisve vix acuminatis, racemis puberulis, pedicellis calycem subæquantibus, legumine latissimo utrinque rotundato.—Specimina fructifera tantum vidi. Stipulæ lineari-lanceolatæ, puberulæ, 3–4 lin. longæ. Foliola majora 3–4 poll. longa, 1½–2 poll. lata, coriacea, nitida. Racemi semipedales. Pedicelli fructiferi 2–3 lin. longi. E florum vestigiis, calyx 2½ lin. longus videtur, puberulus, distincte dentatus; petala 6 lin. longa. Legumen 2½–3-poll. longum, fere 1½ poll. latum, stipite 5–6 lin. longo.

Hab. Trinidad, *Purdie.*

I had formerly referred these fruiting specimens to the *P. polystachyum* of Venezuela, but the pubescent racemes and some other differences make it probable that more complete specimens of both species will show them to be quite distinct.

5. P. STIPULARE, sp. n., foliolis subquinis amplis ovalibus acuminatis, racemi rhachide pubescente, pedicellis calyce brevioribus, vexillo orbiculato alis subbreviore, legumine lato apice rotundato.—Arbor 40-pedalis, ramulis sæpe subinflatis cavis. Stipulæ lanceolatæ, subpollicares, glabræ. Foliola adulta sæpe 8 poll. longa et 4 poll. lata, per anthesin dimidio minora, coriacea et insigniter venosa. Racemi semipedales, fere a basi floribundi. Bracteæ ovatæ, membranaceæ, caducæ, fere 3 lin. longæ. Bracteolæ circa 1½ lin. Pedicelli per anthesin vix lineam longi. Flores 6 lin. Vexilli unguis calycem æquans. Stamina monadelpha. Legumen 3-pollicare, fere 1½ poll. latum, stipite semipollicare.

Hab. Eastern Peru, along streams near Tarapoto, *Spruce*, n. 4292.

The hollow parts of the young branches are always full of ants.

6. P. GRACILE, sp. n., foliolis 5 ovatis vix acuminatis, racemis glabris v. minute puberulis, floribus parvis brevissime pedicellatis calyce brevi, vexillo obovato alas subsuperante.—Stipulæ anguste lanceolatæ, semipollicares. Foliola tenuiter coriacea, nitidula, terminale 3-pollicare,

lateralia minora, petiolulo 3–4 lin. longo. Racemi fasciculati, graciles, 4–5-pollicares. Flores 3 lin. longi, pedicello semilineari. Calyx vix lineam longus. Legumen bipollicare, stipite vix 2 lin. longo, medio 10 lin. latum, apice basique angustatum.

Hab. Eastern Peru, near Tarapoto, *Spruce*, n. 4228.

Readily distinguished by its small flowers from all except the *P. parviflorum*, which has only three leaflets.

7. P. FILIPES, sp. n., foliolis 5 ovatis acuminatis, stipulis lanceolatis, racemis glaberrimis, pedicellis calyce longioribus, bracteolis linearibus, calyce brevi, vexillo alis subbreviore.—Stipulæ 2–3 lin. longæ. Foliola adulta non vidi, juniora longe acuminata. Racemi 2–3-pollicares, floribundi. Bracteæ et bracteolæ ½–1 lin. longi, angustiores quam in cæteris speciebus. Pedicelli filiformes, per anthesin 2–3 lin. longi. Flores nutantes, 5 lin., calyx vix 1½ lin. Ovarium longe stipitatum.

Hab. Cayenne, *Martin*.

Although the specimens are not good, the long slender spikes and narrow bracts prevent my uniting this species with the *P. præcox*, to which it is the most nearly allied.

8. P. PRÆCOX (*Mart.*, *Benth. in Ann. Mus. Vind.*, ii. p. 104 *et in Mart. Fl. Bras. Leg.* ined.), foliolis 5–9 ovatis v. ovali-oblongis subacuminatis stipulis oblongis obtusis, racemis glabris, pedicellis calycem brevem subæquantibus, bracteolis parvis orbiculatis, vexillo orbiculato alas, subæquante.—Stipulæ 3 lin. longæ. Foliola sub 3-pollicaria. Flores conferti, 5 lin. longi, pedicello 1–1½ lin. Legumen non visum.

Hab. Brazil, prov. Rio Janeiro and Bahia (*Blanchet*, n. 2455 bis. ?)

9. P. POLYSTACHYUM (*Benth. in Seem. Bot. Her.* p. 121. t. 21), foliolis subquinis ovatis acuminatis, stipulis orbiculatis obtusis, racemis glabris, pedicellis calycem subæquantibus, bracteolis ovatis, vexillo orbiculato alas subæquante.—Foliola 2–3-pollicaria. Racemi 3–4-pollicares. Flores 6 lin., pedicello 2–3-lineari. Calyx 2 lin. longus, basi vix attenuatus. Stamina monadelpha. Legumen (in varietate Fendleriana) 2½ poll. longum, 1¼ poll. latum, apice rotundatum, insigniter reticulatum, stipite 3 lin. longo superne dilatato.

Hab. Venezuela, near Santa Martha, *Bertero*; in Veraguas, *Seemann*.

β, *Fendleri*, foliolis septenis.

Hab. Venezuela, *Fendler*, coll. 2. n. 1862.

10. P. BLANCHETI (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 7 oblongis acuminatis, racemis glabris, pedicellis calyce turbinato-campanulato subbrevioribus, bracteolis parvis, vexillo orbiculato alis subbreviore.—Flores circa 6 lin. longi.

Hab. Brazil, prov. Bahia (*Blanchet*, n. 3452 & 3671).

Near *P. præcox* and *P. floribundum*, the calyx shaped as in the latter, but much smaller, the leaflets narrow, usually seven.

11. P. FLORIBUNDUM (*Vog. Linnæa*, xi. p. 199), foliolis 5–7 ovali-oblongis acuminatis, stipulis ovali-oblongis sublanceolatisve obtusis,

racemis glabris, pedicellis calyce basi attenuato subæquilongis, vexillo orbiculato alas vix æquante, legumine longe stipitato basi angustato. —*P. dichotomum*, Benth. in Ann. Mus. Vind. ii. p. 104 et (var. *latifolium*?) *P. latifolium*, Benth. *l. c.*—Foliola 2½–3-pollicaria v. maxima 4 poll. longa. Flores 6–7 lin. longi, pedicello 2–3½ lin. rigidulo. Stamina monadelpha. Legumen 3-pollicare, basi in stipitem 6–9 lin. longum attenuatum.

Hab. Brazil, prov. Goyaz, Minas Geraes, and Rio Janeiro.

12. P. SPECIOSUM (*Vog. Linnæa,* xi. p. 200), foliolis 5 amplis ovali-oblongis acuminatis coriaceis, racemis glabris, legumine apice basique rotundato.

Hab. South Brazil.

Only seen in fruit, and perhaps a variety of *P. floribundum*, although in some respects resembling *P. nitens.*

13. P. NITENS (*Vog. Linnæa,* xi. p. 417), foliolis 5 oblongis acuminatis coriaceis nitidis, stipulis acutis, racemis glabris, pedicellis gracilibus calyce turbinato-campanulato sublongioribus, vexillo ovato alas æquante, legumine basi apiceque rotundato.—*P. luteum,* Benth. in Ann. Mus. Vind. ii. p. 104 excl. syn. Vell.; *Hymenolobium luteum,* Mart. Herb. Fl. Bras. n. 177.—Foliola 2–3-pollicaria. Flores 6 lin. longi, petalis quam in cæteris speciebus angustioribus. Legumen 4 poll. longum, 1¼ poll. latum, stipite semipollicari.

Hab. Brazil, near Rio Janeiro.

XII. HYMENOLOBIUM, *Benth.*

Calyx late campanulatus, truncatus, obscure sinuato-dentatus. Vexillum orbiculatum, basi nudum. Petala carinalia libera. Stamina monadelpha, vagina latere superiore fissa. Antheræ versatiles. Ovarium pluriovulatum. Legumen oblongum v. oblongo-lineare, membranaceum, indehiscens, venis ramosis percursum, quarum 2 majores prope basin marginibus subparallelæ. Species unica.

H. NITIDUM, *Benth. in Mart. Fl. Bras. Leg.* ined. Arbor subglabra. Folia alterna, pinnata; foliola 5 rarius 7, opposita cum impari distante, 2–3-pollicaria, ovalia v. oblonga, coriacea, supra nitida. Stipulæ lineares, caducæ. Paniculæ in ramis aphyllis semipedales, laxæ. Flores majusculi, rosei. Calyx 4 lin. longus, crassiusculus.

Hab. Brazil, prov. Alagoas (*Gardner,* n. 1274); Venezuela, on the Rio Uaupès, near Panuré, *Spruce,* n. 2870.

The flowers are nearly those of *Andira Amazonum,* the fruit very different from that of an *Andira.*

A number of pods picked up by Mr. Spruce on the shores of the upper Rio Negro may be those of a second species of this genus, but the attached calyx is rather different, and the foliage and flowers are quite unknown.

XIII. Ostryocarpus, *Hook. fil.*

Calyx campanulatus, truncatus, minute 5-dentatus. Vexillum ecallosum. Alæ a carina liberæ. Carinæ petala dorso connata. Stamen vexillare liberum, cætera connata. Ovarium sessile, pluriovulatum. Legumen orbiculatum, plano-compressum, coriaceum, indehiscens, exalatum. Semen transversum, late oblongum.

Species unica.

O. riparius, *Hook. fil. Fl. Nig.* p. 316. Frutex ramis sarmentosis foliisque glaberrimis. Folia alterna, pinnata, exstipellata. Foliola 5, opposita cum impari distante, 4–8 poll. longa, 2–3 poll. lata, oblonga, utrinque rotundata, apice abrupte et breviter acuminata, coriacea, nitida. Paniculæ racemiformes, 4–8-pollicares v. interdum longiores, pube subsericea ferrugineæ. Flores secus ramulos breves (fasciculorum rhaches elongati) sparsi, subsessiles, 4 lin. longi, albido-flavicantes. Petala glabra. Ovarium pubescens, ovulis 3. Legumen 2 poll. diametro, glaberrimum.

Hab. Sierra Leone, *Don, Vogel*; Senegambia, on the Rio Nunes, *Heudelot*, n. 817; Fernando Po, *Vogel.*

The inflorescence and many of the characters are those of some Lonchocarpi, but the tenth stamen is free, the wings do not adhere to the carina, and the pod is different.

XIV. Lonchocarpus, *H. B. et K.*

Sphinctolobium, *Vog.*; Neuroscapha, *Tul.*; Philenoptera, *Fenzl.*

Calyx truncatus v. brevissime 4–5-dentatus. Alæ supra unguem carinæ leviter cohærentes. Carinæ petala dorso superne leviter cohærentia. Stamen vexillare ima basi liberum, dein cum cæteris in tubum completum connatum. Antheræ versatiles. Ovarium bi-pluri-ovulatum. Legumen planum, oblongum v. elongatum, membranaceum coriaceum v. sublignosum, indehiscens, stylo terminali, suturis non alatis, vexillari tamen interdum lateraliter dilatata v. incrassata. Semina, si plura, dissita, compressa. Radicula inflexa. —Caulis lignosus, arboreus v. sæpius alte scandens. Folia alterna, foliolis oppositis cum impari distante, stipellis raris v. nullis. Racemi simplices v. rarius paniculati. Pedicelli fasciculati v. gemini v. biflori, v. fasciculi rhachi elongato racemoso-sparsi. Flores violacei purpurei v. albi nec lutei, petalis sericeis v. glabris. Calyx peracta anthesi sæpius cyathiformis.

§ 1. Neuroscaphi. Flores secus rhachin gemini. Foliola supra glabra. Vexillum basi bicallosum v. biappendiculatum, extus sæpe sericeum. Leguminis sutura vexillaris præsertim ad semina incrassato-dilatata.

1. L. guatemalensis. (America centralis.)
2. L. sericeus. (America trop., Africa occid.)
3. L. neuroscapha. (Brasilia.)
4. L. parviflorus. (America centralis.)

§ 2. Densiflori. Flores secus rhachin gemini. Foliola supra glabra.

Flores in racemis numerosi, approximati, sæpius parvi. Vexillum tenuiter sericeum v. glabrum, basi appendiculatum v. callosum. Legumen (ubi notum) planum, tenue v. subcoriaceum, suturis nerviformibus v. acutatis nec incrassato-dilatatis.

* *Macrophylli.*

5. L. unifoliolatus. (America centr.)
6. L. latifolius. (America trop.)
7. L. macrocarpus. (America trop.)
8. L. spiniflorus. (Brasilia sept.)

** *Acuminati.*

9. L. hondurensis. (America centr.)
10. L. atropurpureus. (America centr.)
11. L. lanceolatus. (America centr.)
12. L. rubiginosus. (Guiana.)
13. L. nitidus. (Brasilia.)

*** *Obtusifolii.*

14. L. rugosus. (America centr.)
15. L. obovatus. (Mexico.)

§ 3. ERIOPHYLLI. Flores secus rhachin gemini. Foliola utrinque molliter tomentosa v. villosa (in *L. Fendleri* supra glabra). Vexillum sericeum. Cætera *Densiflororum*.

16. L. phaseolifolius. (America centr.)
17. L. velutinus. (America centr.)
18. L. Fendleri. (Venezuela.)
19. L. eriophyllus. (Mexico.)

§ 4. LAXIFLORI. Flores secus rhachin gemini. Racemi foliis breviores, dissitiflori. Vexillum glabrum v. tenuissime subsericeum, basi in unguem angustatum et omnino ecallosum. Legumen (ubi notum) planum, subcoriaceum, suturis nec carinatis nec dilatatis.

20. L. filipes. (Brasilia.)
21. L. virgilioides. (Brasilia.)
22. L. denudatus. (Brasilia.)
23. L. campestris. (Brasilia.)
24. L. mollis. (Brasilia.)
25. L. obtusus. (Brasilia.)

§ 5. PUNCTATI. Flores secus rhachin gemini, v. pedicello communi irregulariter elongato plurifloro subpaniculati. Folia glabra, foliolis pellucido-punctatis (punctis oblongis rotundisque intermixtis). Vexillum glabrum v. tenuissime sericeum. Legumen (ubi notum) subcoriaceum, suturis tenuiter utrinque marginatis nec alatis.

26. L. violaceus. (America trop.)
27. L. confertiflorus. (Peruvia orient.)

28. L. araripensis. (Brasilia.)
29. L. subglaucescens. (Brasilia.)

§ 6. PANICULATI. Flores irregulariter paniculati. Racemorum ramuli seu pedunculi proprii sæpius elongati pluriflori. Folia impunctata. Vexillum glabrum v. tenuissime sericeum. Legumen (ubi notum) tenue, submembranaceum, suturis nec dilatatis nec alatis.

30. L. præcox. (Brasilia.)
31. L. cyanescens. (Africa tropica occid.)
32. L. laxiflorus. (Africa tropica.)
33. L. philenoptera. (Africa orient.)
34. L.? macrostachyus. (Africa tropica occid.)

§ 7. FASCICULATI. Flores in racemo simplici v. vix subramoso secus rhachin fasciculati, fasciculorum rhachi proprio nodiformi v. rarius ad basin racemi (paniculæ racemiformis) parum elongato. Legumen (ubi notum) planum, membranaceum v. coriaceum, suturis non alatis nerviformibus v. vexillari leviter dilatata.

* *Carina vix arcuata, ovulis 2.*

35. L. rariflorus. (Brasilia sept.)
36. L. floribundus. (Brasilia sept., Guiana.)
37. L. nitidulus. (Brasilia sept., Guiana.)
38. L. negrensis. (Brasilia sept.)

** *Carina vix arcuata, ovulis circa 6.*

39. L. Barteri. (Africa occid. tropica.)
40. L. rufescens. (Guiana.)

*** *Carina valde arcuata, ovulis 6–8 v. pluribus.*

41. L. Spruceanus. (Brasilia bor.)
42. L. densiflorus. (Guiana, Venezuela.)
43. L. glabrescens. (Brasilia sept.)
44. L. costatus. (Brasilia.)

**** *Vexillo angusto, petalis omnibus rectiusculis, ovulis 2.*

45. L. fasciculatus. (Africa occid.)
46. L. brachypterus. (Africa occid.)

§ 1. NEUROSCAPHI.

1. L. GUATEMALENSIS, foliolis 5–7 ovatis oblongisve novellis subsericeis demum glabratis, racemis cano-sericeis, pedicellis plerisque geminis, bracteolis minimis a calyce remotis, vexillo cano-sericeo, legumine elongato glabrescente sutura vexillari ad semina leviter dilatato.— Foliola adulta 2–3-pollicaria, brevissime acuminata v. obtusata, longiuscule petiolulata, chartacea, nitidula. Racemi ad ramos annotinos solitarii v. fasciculati, 3–5-pollicares, tomento minuto sericeo potius canescentes quam rufescentes. Pedicelli 1–2 lin. longi, sessiles v. pedicello communi brevissimo fulti. Calyx tenuissime cano-sericeus

basi supra bracteolas minutas in stipitem attenuatus. Flores cæterum forma et magnitudine iis *L. sericei* similes. Legumen immaturum tantum et monospermum vidi, jam 3 poll. longum, ad semen 10 lin. latum, infra semen longe angustatum, sutura vexillari ad semen conçaviuscula 1½ lin. lata.

Hab. Guatemala, *Friedrichsthal*; South Mexico, *Jurgensen*, n. 159.

In flower the species resembles on the one hand the *L. sericeus*, from which it may be known by the small distant bracteoles and whitish aspect of the inflorescence, and on the other hand the *Piscidia erythrina*, but the inflorescence is less branched and not so silky.

β, Jurgenseni, foliolis 7–11, pedicellis plerisque bifloris.

Hab. South Mexico, *Jurgensen*, n. 247.

γ? Fendleri, pedicellis bifloris, floribus minoribus, calycis dentibus evidentioribus rufescentibus.

Hab. Chagres, *Fendler*, n. 94.

2. L. SERICEUS (*H. B. et K. Nov. Gen. et Sp.* vi. p. 383 in adnot.), foliolis 7–11 ovalibus oblongisve breviter acuminatis subtus tomentosis puberulisve, pedicellis geminis v. breviter bifloris, bracteolis calyci approximatis, vexillo argenteo-sericeo basi transverse calloso-appendiculato, legumine coriaceo-sublignoso, sutura vexillari ad semina parum dilatata.—*Robinia sericea*, Poir.; *Lonchocarpus sericeus*, et *L. pyxidarius*, DC. Prod. ii. p. 260; *L. tomentosus*, Tul. Arch. Mus. Par. iv. p. 82.—Arbor. Foliola vulgo 2–3-pollicaria. Flores 7–8 lin. longi, rosei v. violacei, petalis insigniter sericeis.

Hab. Widely spread in Tropical America; the normal form, with the leaflets more or less rusty-pubescent underneath, is found chiefly on the continent; in various parts of Brazil (*Gardner*, n. 1275), in Guiana and New Granada, and in Western Tropical Africa.

β, glabrescens, foliolis subtus glabris v. vix minute puberulis.—*L. Domingensis* et *L. formosianus*, DC. Prod. ii. p. 260; *L. macrophyllus*, H. B. et K. Nov. Gen. et Sp. vi. p. 383.

Hab. In Tropical America; Cayenne, *Martin*; frequent in Venezuela and New Granada (*Holton*, n. 975 & 990, *Schlium*, n. 74, &c.), in St. Domingo and Jamaica, and in Western Tropical Africa.

I had at one time thought that the glabrous foliage was sufficient to distinguish this form from the last, especially as the only pod I then knew had assumed a different shape, owing to more of the ovules having come to maturity; but the copious specimens we have now received from various collectors in Western Tropical Africa show that all belong to one species. Some are precisely similar to Purdie's glabrous Jamaican ones, others as closely resemble the Brazilian ones described by Tulasne as *L. tomentosus*, and they all pass into each other very gradually by numerous intermediates. The leaves are very variable in size; when very luxuriant, some of the leaflets are five or even six inches long, though the ordinary size on the flowering branches is but two or three inches.

γ?, bracteolis parvis.

Hab. In Tropical America, Surinam, *Hostmann*, n. 234; Cuba, *Linden*, n. 2138.

Not having seen the pod of this plant, I have some doubts of its specific identity, for the foliage, although closely resembling that of the moderately pubescent forms of *L. sericeus*, is also very nearly that of *L. macrocarpus*, of which I have not seen the flowers. The bracteoles are very small and deciduous, whereas in *L. sericeus* they are usually orbicular, and half a line or more in diameter.

3. L. NEUROSCAPHA, foliolis 7–11 ovatis oblongisve glabris v. subtus petiolisque rufo-pubescentibus, racemis dense rufo-tomentosis, floribus parvis plerisque geminis, vexillo sericeo, legumine coriaceo glabrescente sutura vexillari latissime concavo-dilatato.—*Neuroscapha Guilleminiana*, Tul. Ann. Sc. Nat. Par. sér. 2. xx. p. 137, et Arch. Mus. Par. iv. p. 76. t. 6; *Neuroscapha pubigera* et *N. Martiana*, Tul. Ann. Sc. Nat. Par. sér. 2. xx. p. 138, et Arch. Mus. Par. iv. pp. 78, 79.—Folia fere *L. sericei*. Flores 4–5 lin. longi. Leguminis maturi dilatatio suturæ vexillaris usque ad 5 lin. lata.

Hab. Brazil, abundant about Rio Janeiro, extending to Minas Geraes and Bahia (*Blanchet*, 3254, 3554; *Mart. Herb. Bras.* 1159).

The peculiar dilatation of the upper margin of the pod, on which Tulasne founded his generic character, common to all this group, is more marked in this than in any other species, and may be traced in a slighter degree in several others belonging to different groups of the genus.

4. L. PARVIFLORUS, sp. n., foliolis 5–7 ovatis oblongisve acuminatis cano-sericeis v. demum glabratis, pedicellis abbreviatis subgeminis, floribus parvis sericeis, legumine glabro tenuiter coriaceo sutura vexillari ad semina dilatato.—Frutex videtur, ramis demum glabratis lenticellis albis verrucosis. Partes novelli pube sericea canescentes v. rufescentes. Folia adulta nunc glaberrima, nunc tenuiter cano-sericea. Foliola fere semper 5, pallide virentia, 1–2-pollicaria, pleraque longiuscule acuminata v. acutata, membranacea v. vix coriacea. Racemi conferti, pollicares, densiflori. Pedicelli ½ lin. longi, pedicellis propriis brevissimis. Bracteolæ ovatæ, subpersistentes. Flores 3 lin. longi. Petala sericea. Vexillum auriculis inflexis in unguem decurrentibus appendiculatum. Ovula 6–8. Legumen 1–2-spermum, 1–2½-pollicare, glabratum, tenuius quam in præcedentibus speciebus, ad semen 6–7 lin. latum, sutura vexillari insigniter concavo-dilatata.

Hab. Central America, South Mexico, *Jurgensen*, n. 219; in the Vulcan El Viejo, and in the province of Segovia, *Œrsted*; in "New Spain," *Herb. Pavon.*

In the size of the flowers, inflorescence, and foliage, it is near *L. atropurpureus*, but readily known by its more silky petals and very different pod.

§ 2. Densiflori.

[As the species of this group differ from the last almost entirely in the pod alone, the position of those which have not yet been seen in fruit is in some cases doubtful.]

5. L. unifoliolatus, sp. n., foliolis solitariis amplis ovatis glabris nitidulis, pedicellis plerisque bifloris, calyce vexilloque tenuiter sericeis. —Totus floribus exceptis glaberrimus. Foliola in specimine omnia ad apicem petioli pollicaris solitaria, ovata v. suboblonga, acuminata, 3–5 poll. longa, 2–2½ poll. lata, basi rotundata, juniora membranacea, adulta subcoriacea et nitidula, petiolulo 2–3 lin. longo. Racemi graciles, 5–6-pollicares. Flores inter minores (4–5 lin. longi). Pedicelli breves. Bracteolæ parvæ, angustæ, caducæ. Calyx 1 lin. truncatus. Vexillum basi leviter calloso-plicatum. Ovarium sericeo-pilosum. Legumen ignotum.

Hab. South Mexico, *Jurgensen*, n. 717.

6. L. latifolius (*H. B. et K. Nov. Gen. et Sp. Pl.* vi. p. 383), glaber v. tenuissime rufo-sericeus, foliolis 5–9 amplis ovali-oblongis acuminatis tenuibus glabris v. subtus pube minuta conspersis, racemis elongatis, pedicellis plerisque bifloris calycem æquantibus, bracteolis minutis, vexillo tenuiter sericeo, ovulis 2, legumine oblongo v. lato-lineari plano tenui demum glabro suturis acutis nec alatis nec dilatatis.—*Amerimnum latifolium*, Willd. Spec. Pl. iii. p. 909; *Dalbergia pentaphylla* et *D. heptaphylla*? Poir. Dict. Suppl. ii. p. 445, 446; *Lonchocarpus latifolius*, *L. pentaphyllus*, *L. heptaphyllus*? et *L. oxycarpus*, DC. Prod. ii. p. 260, 261.—Arbor 30–40-pedalis, ramis debilibus. Petioli communes 6–10-pollicares. Foliola maxima 6–8 poll. longa, 2–3 poll. lata, sæpius tamen subdimidio minora, minus coriacea quam in præcedentibus et læte virentia, subtus elevato-pennivenia, costa venisque primariis sæpius tenuissime rufo-sericeis. Pedunculi axillares, solitarii v. gemini, 3–5-pollicares, jam infra medium floridi. Flores 4–5 lin. longi, sæpius pallidi (v. albi?) rarius atro-violacei. Vexillum basi late truncatum, vix callosum. Ovarium tenuiter sericeum, ovulis 2 remotis. Legumen 2–3 poll. longum, 8–10 lin. latum, 1–2-spermum, inter semina non vel vix constrictum.

Hab. Common in the West Indies (Cuba, *Wright*, n. 141, 142; Martinique, *Sieber*, 176), and adjoining parts of South America, in Surinam, British Guiana, Portorico, Veraguas, and Central America to Nicaragua, *Œrsted*; and Teapa, *Linden*, n. 732; the latter a variety with dark-coloured flowers. I have not seen it from Brasil, Ecuador, or Peru.

The species is generally known by its somewhat large leaflets, long rather than broad, notwithstanding its name, of a thinner texture and a lighter colour than most species, with oblique prominent veins, and rather short racemes of small flowers on comparatively long pedicels. The fruit is often like that of a *Dalbergia*.

7. L. MACROCARPUS, sp. n., foliolis 9–17 obovali-oblongis breviter acuminatis subtus molliter tomentoso-puberulis, pedicellis geminis biflorisve, legumine oblongo amplo apice basique angustato subcoriaceo tenuiter tomentoso, sutura vexillari acuta nec alata nec dilatata.—Arbor. Folia 4-pollicaria fere *L. latifolii* sed subtus evidentius tomentosa et rigidiora, iis *L. sericei* approximantia. Legumen (adhuc immaturum) monospermum 3–4 poll. longum et 1–1½ poll. latum, dispermum jam 5–6 poll. longum, undique tomento brevissimo molli subsericeo rufescens.

Hab. New Spain, *Herb. Pavon*; Venezuela, *Fendler*, n. 1861; Santa Cruz in Bolivia, *D'Orbigny*, n. 578.

Not having seen the flowers, I do not feel certain as to the affinities of this species. The foliage is between that of *L. latifolius* and *L. sericeus*, the fruit like that of *L. latifolius*, but twice as large.

β, *sericophylla*, foliolis 11–17 oblongis subtus magis tomentosis v. interdum molliter sericeis.

Hab. On the banks of the Huallaga in the province of Maynas, Eastern Peru, *Spruce*, n. 4597.

This variety comes still nearer the *L. sericeus* in foliage, although so different in fruit. I have not seen the flowers.

8. L. SPICIFLORUS, *Mart.*, foliolis 7–9 amplis obovali-oblongis obtusissimis v. brevissime acuminatis glabris v. subtus tenuissime ferrugineo-puberulis, racemis folio brevioribus dense multifloris, pedicellis subgeminis brevissimis, vexillo glabriusculo, legumine plano tenui suturis acutis non dilatatis.—Foliola 4–6-pollicaria. Racemi 3–4-pollicares, floribus undique confertis fere sessilibus vix 5 lin. longis. Legumen (nondum maturum) fere *L. latifolii*.

Hab. North Brazil.

9. L. HONDURENSIS, sp. n., glaber, foliolis 5 ovali-oblongis acuminatis glabris subcoriaceis, racemis multifloris, pedicellis plerisque bifloris brevissimis, vexillo tenuiter sericeo, ovulis circa 6.—A *L. latifolio* differt foliolis minoribus subcoriaceis venis primariis subtus vix prominulis et pedicellis cum pedicello communi calyce brevioribus. Foliola 2–3-pollicaria v. terminale rarius longius. Racemi densiflori, 4–6-pollicares. Flores atro-violacei, magnitudine *L. latifolii*. Vexilli auriculæ inflexo-appendiculatæ. Legumen ignotum.

Hab. Honduras, *R. Temple in Herb. Banks*; Tabasco (Yucatan), *E. P. Johnson*, n. 31.

10. L. ATROPURPUREUS, sp. n., foliolis 5–7 (rarius 9) parvis ovatis oblongisve subacuminatis glabris v. subtus vix pilosulis, racemis confertifloris folio subbrevioribus, pedicellis brevibus plerisque bifloris, vexillo glabro, ovulis circa 6, legumine stipitato glabro tenui suturis non dilatatis.—*Cytisus atropurpureus* et *C. parviflorus*, Herb. Pavon. in Herb. Boiss.—Arbor parva, primo intuitu *L. parvifloro* similis, sed glabritie, vexillo glabro, et legumine facile distincta. Rami ramo-

sissimi. Petioli tenues. Foliola 1–1¼ rarius 2-pollicaria, concoloria, glabra v. rarius subtus secus costam pilosula. Racemi bipollicares. Pedicelli infra ramificationem vix lineam longi, pedicellis propriis brevioribus. Bracteæ et bracteolæ minutæ. Flores 4 lin. longi. Vexillum basi supra unguem transverse bicallosum. Ovarium sericeo-pubescens.

Hab. New Spain, *Herb. Pavon*; Venezuela; Hills near Santa Martha, *Purdie*; Maracaybo, *Plée*; Andes of Truxillo and Merida, *Linden*, n. 277.

11. L. LANCEOLATUS, sp. n., foliolis 9–13 parvis ovatis oblongisve subacuminatis supra pilosulis subtus petiolis racemisque molliter pubescentibus, racemis confertifloris folio brevioribus, pedicellis brevibus plerisque bifloris, vexillo tenuissime sericeo, ovulis circa 6, legumine stipitato elongato tenui.—*Cytisus lanceolatus*, Herb. Pavon.—Species *L. atropurpureo* valde affinis, differt pube et foliolis numerosioribus minoribus raro pollicem longis. Inflorescentia et flores eadem. Calyx et vexillum tenuiter rufo-sericea. Legumen junius simillimum nisi evidentius sericeum; perfectum non vidi.

Hab. N. Spain, *Herb. Pavon in Herb. Boiss.*

12. L. RUBIGINOSUS, sp. n., foliolis 5–7 parvis obovatis oblongisve breviter et obtuse acuminatis basi cuneatis supra glabris nitidulis subtus tenuissime ferrugineo-puberulis, racemis confertifloris folio brevioribus, pedicellis plerisque bifloris (ovulis pluribus), legumine tenui anguste lineari plano glabro.—*Robinia rubiginosa*, Herb. Banks.—Ramuli tenues, novelli velutino-tomentelli, demum glabrati. Petioli communes tenues, 1½–2½-pollicares. Folia maxima 1½-pollicaria, pleraque breviora, subcoriacea, subtus elevato-pennivenia. Racemi graciles. Flores *L. parviflori*. Legumen usque ad 3 poll. longum, vix 3 lin. latum.

Hab. Guiana, *Aublet* (*Herb. Banks*). With little to distinguish it in foliage and flowers from the *L. parviflorus*; this species has a totally different fruit.

13. L. NITIDUS, foliolis 7–9 parvis oblongis acuminatis glabris impunctatis, racemis laxe multifloris folio subbrevioribus, pedicellis bifloris, vexillo tenuissime subsericeo, ovulis circa 6.—*Sphinctolobium nitidum*, Vog. Linnæa, xi, p. 419.

Hab. South Brazil. Differs from *L. atropurpureus* in its narrower leaflets, looser racemes, and rather larger and paler flowers. The pod is unknown.

14. L. RUGOSUS, sp. n., foliolis 9–13 oblongis obtusissimis supra glabris subtus adpresse ferrugineo-pubescentibus, racemis folia subæquantibus fere a basi floribundis, pedicellis geminis, vexillo sericeo, legumine sericeo-villoso tenui plano suturis nudis.—Ramuli et petioli ferrugineo-villosi. Petioli communes 3–4-pollicares. Foliola iis *L. sericei* subsimilia, nisi multo minora et utrinque obtusa v. retusa; pleraque 1½-pollicaria, supra nitidula et venis impressis subrugosa, subtus elevato-

pennivenia, undique præsertim ad venas rufo-sericea. Racemi ferrugineo-pubescentes. Pedicelli 1–1½ lin. longi. Flores parvi. Legumen brevissime stipitatum (immaturum) 2 poll. longum, circa 7 lin. latum, pilis mollibus subsericeis rufescentibus vestitum.

Hab. Campeachy, *Houstoun*, in *Herb. Banks.*

15. L. OBOVATUS, sp. n., foliolis 5–9 parvis obovatis obtusissimis emarginatisve parce pilosulis glabratisve, racemis folio longioribus pedunculatis densifloris, pedicellis geminis subbiflorisve, vexillo tenuiter sericeo, ovulis circa 5.—Petioli communes tenues, 1½ v. rarius 2 poll. longi. Foliola 8–9 lin. v. rarius 1 poll. longa, basi in petiolulum longum sæpe subtortum angustata, rigidule membranacea, reticulata, utrinque viridia v. subtus pallida, pilis brevibus conspersa. Racemi pars florifera bipollicaris v. longior, pedunculo pollicari fulta, rhachi pedicellis calycibusque tenuiter tomentoso-sericeis. Flores conferti, penduli, semipollicares (rosei?). Vexillum supra unguem tenuiter biplicato-callosum. Legumen ignotum.

Hab. Mexico; Chilla, in the district of Puebla, *Andrieux*, n. 440.

§ 3. ERIOPHYLLI.

16. L. PHASEOLIFOLIUS, sp. n., foliolis 3 ovato-orbiculatis subrhombeisve subtus v. utrinque molliter velutino-tomentosis, floribus plerisque geminis subsessilibus, bracteolis orbiculatis, vexillo sericeo, ovulis 2.—Folia et inflorescentiæ pube molli subfulvescente dense vestita, pagina superior foliolorum demum nonnunquam fere denudata. Foliolum terminale 3½–4 poll. longum, 2½–3 poll. latum, lateralia minora, omnia obtusa v. breviter acuminata, basi obtusissima, subtus elevato-pennivenia et reticulato-venulosa. Racemi axillares, bipollicares. Flores circa 4 lin. longi. Bracteolæ orbiculatæ, diu persistentes. Vexillum argenteo-sericeum, basi leviter plicato-inflexum. Ovarium pilosulum.

Hab. Mexico, near Tehuantepec, *Andrieux*, n. 462.

17. L. VELUTINUS (*Benth. in Seem. Bot. Her.* p. 111), foliolis 5–9 ovalibus oblongisve utrinque petiolis paniculaque molliter tomentosis, pedicellis plerisque bifloris, bracteolis minutis caducissimis, vexillo tomentoso, ovulis 2–4.—Arbor. Foliola 1½–3-pollicaria, nunc breviter acuminata et basi angustata, nunc utrinque rotundata et obtusissima, v. apice retusa, tomento molli subvelutino flavicantia, subtus elevato-pennivenia et reticulato-venulosa. Racemi 3–4-pollicares, superiores in paniculam dispositi. Pedicelli proprii ½–1 lin. longi, pedicello communi 1 lin. longo fulti. Flores 4–5 lin. longi. Vexillum dense sericeo-tomentosum, basi ad margines leviter callosum. Ovarium post anthesin paullo accretum dense tomentosum. Legumen perfectum non vidi.

Hab. Central America: Culebra, *Hinds*; near San Carlos, prov. Panama, *Seemann*; Nicaragua, *Œrsted.*

18. F. Fendleri, sp. n., foliolis 7–9 oblongis subobovatisve obtusis demum coriaceis, supra glabris nitidis, subtus molliter tomentosis, racemis infrafoliaceis, pedicellis plerisque geminis, vexillo tenuiter sericeo, ovulis circa 6, legumine elongato plano tenui tomentello, sutura vexillari leviter dilatata.—Ramuli petioli et pagina inferior foliolorum tomento denso molli canescente v. rufescente obtecti. Foliola subbipollicaria in speciminibus floridis membranacea, supra ad venas primarias tenuissime tomentella, subtus dense et mollissime tomentoso-sublanata; in fructiferis coriacea, supra glaberrima nitida et subbullata, subtus dense subrufescenti-tomentosa. Racemi 4-pollicares. Pedicelli 2 lin., flores 7 lin. longi. Vexillum basi nec auriculato-plicatum, nec transverse callosum, sed callis 2 tenuibus longitudinalibus in medio ungue decurrentibus. Legumen stipitatum, monospermum 2 poll., 3-spermum fere 4 poll. longum, 9 lin. latum.

Hab. Venezuela, near the colony of Tovar, *Fendler*, 1st coll. n. 2219 (*fl.*), and 2nd coll. n. 1863 (*fr.*).

The species might be equally well placed in the preceding group near *L. rugosus*, but it has a much more downy-woolly appearance. The flowers are nearly twice the size.

19. L. eriophyllus, sp. n., foliolis 11–19 (parvis) oblongis utrinque petiolo racemisque mollissime tomentosis, pedicellis geminis biflorisve, bracteolis minutis caducis, vexillo tomentoso.—A *L. velutino* distinguitur imprimis foliolis parvis numerosis et floribus duplo majoribus. Pubes mollissima, canescens v. fulvescens. Foliola vix pollicaria, 3–4 lin. lata, obtusa v. acutiuscula. Pedicelli 2 lin. longi, sessiles v. pedicello communi brevi fulti. Calyx molliter tomentosus. Flores 9–10 lin. longi. Vexillum supra unguem brevem leviter calloso-plicatum. Ovula plurima (6–8?) minima.

Hab. Mexico, near Chilla in the district of Puebla, *Andrieux*, n. 439.

§ 4. Laxiflori.

20. L. filipes (*Benth. in Mart. Fl. Bras. Leg.* ined.), glaber, foliolis 3 ovatis oblongisve acuminatis, racemis gracilibus dissitifloris, pedicellis subgeminis filiformibus, vexillo glaberrimo, legumine oblongo subcoriaceo lævi, suturis nudis.—Foliola 2–3-pollicaria. Flores semipollicares.

Hab. Brazil, near Rio Janeiro.

21. L. virgilioides (*Benth. in Mart. Fl. Bras. Leg.* ined.), glaber, foliolis 5 ovatis oblongisve impunctatis, racemis infrafoliaceis brevibus laxifloris, pedicellis subgeminis, vexillo glaberrimo ecalloso, legumine elongato subcoriaceo, suturis nudis.—*Sphinctolobium virgilioides*, Vog. Linnæa, xi. p. 418.—Foliola 1½–2-pollicaria. Flores circa 7 lin. longi.

Hab. Brazil, near Rio Janeiro; also prov. Bahia (*Blanchet*, n. 3421).

When in flower only it is scarcely to be distinguished from the *Müllera*

moniliformis, but by the total absence of any pellucid dots on the leaves.

22. L. DENUDATUS (*Benth. in Mart. Fl. Bras. Leg.* ined.), petiolis racemisque puberulis, foliolis 5–7 ovatis oblongisve glabris v. subtus minute puberulis, racemis ad ramos aphyllos brevibus laxe paucifloris, pedicellis subgeminis, vexillo tenuissime subsericeo ecalloso.—Foliola 1½–2½ poll. longa. Flores circa 7 lin. Legumen ignotum.
Hab. North Brazil, near Santarem, *Spruce*.

23. L. CAMPESTRIS (*Mart. Fl. Bras. Leg.* ined.), petiolis racemisque rufo-tomentosis, foliolis 7–9 ovali-oblongis subacuminatis pallidis glabriusculis, racemis ad ramos aphyllos brevibus laxifloris, pedicellis subgeminis, vexillo glabriusculo, ovulis 2–3, legumine tenui, suturis nerviformibus.—Foliola pleraque 1–1½-pollicaria. Flores circa 4 lin. longi.
Hab. Brazil, Minas Geraes and Goyaz.

24. L. MOLLIS (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 7–9 ovatis oblongisve subacuminatis supra puberulis, subtus ramulis petiolisque molliter pubescentibus, racemis brevibus axillaribus v. infrafoliaceis laxe paucifloris, pedicellis subgeminis, vexillo glabriusculo, ovulis 2–3.—A *L. campestri* differt imprimis pube.
Hab. South Brazil.

25. L. OBTUSUS (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 5–9 obovali-oblongis obtusissimis supra glabris nitidulis subtus petiolis racemisque laxe rufo-pubescentibus, racemis subfasciculatis lateralibus brevibus laxifloris, vexillo glabriusculo, ovulis circa 8.—Flores quam in *L. campestri* paullo majores, folia similia nisi obtusiora, et ab illa specie ovulorum numero constanter differre videtur.
Hab. Brazil, prov. Bahia (*Blanchet*, n. 2830).

§ 5. PUNCTATI.

26. L. VIOLACEUS (*H. B. et K. Nov. Gen. et Sp.* vi. p. 383, in adnot.), glaber, foliolis 5–13 ovatis acuminatis pellucido-punctatis, pedicellis bifloris, vexillo glabro, legumine coriaceo, suturis nudis v. vexillari angustissime marginata.—*Robinia violacea*, Jacq. Pl. Amer. p. 210; *Robinia latifolia*, Mill. Dict. non Poir.; *Robinia sepium*, Sw. Fl. Ind. Occid. p. 1258 non Jacq. et ideo *Lonchocarpus Swartzii*, DC. Prod. ii. p. 160; *Lonchocarpus punctatus*, H. B. et K. Nov. Gen. et Sp. Amer. vi. p. 383.—Foliola 2–3-pollicaria. Racemi laxi, pedicellis infra bifurcationem 2–3 lin. longis, pedicellis propriis vix brevioribus. Bracteæ et bracteolæ minutæ, cito deciduæ. Flores majusculi, violacei, suaveolentes, glabri. Calyx 3 lin. longus. Vexillum circa 7 lin. longum, basi cordatum et auriculis inflexis appendiculatum. Ovarium 3–4-ovulatum. Legumen monospermum 2-pollicare, v. dispermum fere

4 poll. longum, ad semina 1 poll. latum, inter semina, ad apicem et basi valde contractum.

Hab. Frequent in the West Indies, chiefly near the sea; also in Venezuela near Cumana, *Humboldt & Bonpland, Funcke*, n. 12, etc.; in the Andes of Truxillo and Merida, *Linden*, n. 275.

The pellucid dots, intermixed with lines, are very conspicuous, whilst the inflorescence readily distinguishes it from the three following species.

27. L. CONFERTIFLORUS, sp. n., glaber, foliolis 3–5 late ovalibus suboblongisve pellucido-punctatis, paniculis racemiformibus confertifloris, pedicellis irregulariter subracemiferis, calyce vexilloque tenuiter sericeis.—Foliola pleraque 3–4 poll. longa, 1½–2 poll. lata, punctis pellucidis ut in præcedente oblongis rotundisve notata, per anthesin membranacea, demum rigidiora et nitidula. Racemi axillares, 3–5-pollicares, fere a basi floribundi, ramulis (seu pedicellis plurifloris) brevibus, pedicellis propriis brevissimis. Bracteæ et bracteolæ minimæ subpersistentes. Flores 5–6 lin. longi. Vexillum basi nudum. Ovula 5?

Hab. Eastern Peru, near Tarapoto, *Spruce*, n. 4219.

28. L. ARARIPENSIS (*Benth. in Mart. Fl. Bras. Leg.* ined.), glaber, foliolis 7–11 ovali-oblongis obtusis pellucido-punctatis, paniculis racemiformibus laxis, pedicellis irregulariter subracemiferis, calyce distincte 4-dentato, vexillo glabro basi nudo.—Foliola pleraque semipollicaria. Flores quam in *L. violaceo* minores.

Hab. Brazil, prov. Ceara (*Gardner*, n. 1536).

29. L. SUBGLAUCESCENS (*Mart. Fl. Bras. Leg.* ined.), foliolis 9–11 ovatis oblongisve acuminatis glabris subtus glaucescentibus pellucido-punctatis, paniculis laxis, pedicellis plerisque solitariis (ramulis paniculæ racemiferis) calyce vexilloque tenuiter sericeis.—*Sphinctolobium floribundum*, Vog. Linnæa, ii. p. 419.

Hab. South Brazil to Minas Geraes.

The inflorescence is that of the following group, whilst the pellucid dots are as in the three preceding species.

§ 6. PANICULATI.

30. L. PRÆCOX (*Mart. Fl. Bras. Leg.* ined.), foliolis 9–11 ovalibus oblongisve obtusis glabris impunctatis, paniculis brevibus laxifloris, ramulis (pedicellis) brevibus irregulariter racemiferis, calyce vexilloque tenuiter sericeis.

Hab. Brazil, prov. Minas Geraes.

Somewhat intermediate between the two last in inflorescence, it differs from both in the total absence of any pellucid dots to the leaves.

31. L. CYANESCENS, foliolis 9–13 ovalibus oblongisve breviter obtusis acuminatis glabris v. subtus pilis minutis conspersis, paniculis elongato-pyramidatis multifloris, calyce tomentello, vexillo glabro, legumine elongato plano tenui glabro v. juniore pubescente.—*Robinia*

cyanescens, Schum. et Thonn. Beskr. Pl. Guin. p. 351.—Frutex alte scandens. Foliola 3–5-pollicaria, concoloria. Paniculæ partiales 6–10-pollicares, ramulis ½–1-pollicaribus floribundis, in axillis summis solitariæ v. ad apicem rami in paniculam ultrapedalem dispositæ. Flores 4½ lin. longi, violacei, in sicco cyanescentes. Vexillum basi exauriculatum, sed supra unguem medio longitudinaliter bicallosum. Legumen immaturum jam 6–7 poll. longum, 1 poll. latum, 4–5-spermum, fere membranaceum, ad semina paullulum incrassatum et reticulatum, illud *Dalbergiæ* simulans.

Hab. West Tropical Africa, *Thonning, Heudelot*, n. 825, *Barter*, n. 1593.

32. L. LAXIFLORUS (*Guill. et Perr. Fl. Seneg.* i. p. 226), foliolis subquinis ovalibus oblongisve obtusis v. vix acuminatis glabris v. vix subtus puberulis, paniculis divaricato-ramosis laxifloris, calyce puberulo, vexillo glabro, legumine elongato tenui glabro.—Arbor. Foliola maxima 2½-pollicaria, pleraque multo minora, sæpe vix pollicaria, pallida, reticulato-venosa. Panicula brevior et laxior quam in *L. cyanescente*, ramulis longioribus dissitifloris. Pedicelli plerique gemini, breves. Flores vix 5 lin. longi, flavi dicuntur, sed color dubius. Vexillum basi auriculis inflexo-subcallosis appendiculatum. Legumen monospermum bipollicare, 2–3-spermum fere 3-pollicare, 6–7 lin. latum, submembranaceum, suturis nerviformibus.

Hab. Senegambia, *Leprieur & Perrottet, Heudelot*, n. 152.

33. L. PHILENOPTERA, foliolis 5–7 anguste oblongis obtusis v. vix acuminatis glaberrimis, paniculis divaricato-ramosis laxifloris canotomentosis, calyce tomentoso, vexillo glabro, legumine elongato tenui glabro.—*Philenoptera Kotschyana*, Fenzl. Flora, 1844, p. 312; *Philenoptera Schimperiana*, Hochst. Pl. Schimp. exs. et A. Rich. Fl. Abyssin. i. p. 232; *Capassa violacea*, Klotzsch. Pl. Peters. exs.—Frutex v. arbor parva *L. laxifloro* valde affinis, differt foliolorum forma, floribus paullo majoribus, calyce cano-tomentoso. Foliola maxima semipedalia, pleraque 3-pollicaria, circa 1 poll. lata v. etiam minora, nunc viridia concoloria, nunc utrinque glauca v. subtus fere incana. Panicula aphylla, floribunda (e paniculis numerosis subracemiformibus fasciculatis composita) semipedalis v. paullo longior et latior. Flores violacei videntur. Legumen omnino *L. laxiflori*.

Hab. Tropical Africa, chiefly Eastern; Abyssinia, *Schimper*; Fazokal, *Kotschy*, n. 522; Mozambique, *Peters*; near lake Ngami, *M'Cabe*.

34. L.? MACROSTACHYUS (*Hook. fil. Fl. Nig.* p. 317), foliolis 5–7 ovali-oblongis acuminatis subcoriaceis glabris v. subtus minutissime sericeis, paniculis elongatis floribundis minute fusco-pubescentibus, vexillo obovato glabro.—Foliola 4–6-pollicaria. Panicula ultrapedalis, ramulis brevibus densifloris, uti calyces pube minuta atrofuscis. Pedicelli brevissimi. Bracteolæ orbiculatæ. Vexillum quam in præcedentibus angustius, basi biauriculatum.

Hab. Western Tropical Africa, *Vogel*.

The pod is unknown; and, as the vexillum is narrower than in most *Lonchocarpi*, the genus is as yet uncertain. It appears, however, much more like a *Lonchocarpus* than a *Millettia*.

§ 7. Fasciculati.

35. L. rariflorus (*Mart. Fl. Bras. Leg.* ined.), foliolis 3–5 ovatis brevi-acuminatis coriaceis supra nitidulis subtus ferrugineo-puberulis, racemis elongatis, floribus fasciculatis, vexillo tenuiter sericeo, ala carinaque rectiusculis, ovulis 2, leguminis suturis nudis.—Foliola 3–5-pollicaria. Racemi sæpe ultrapedales, fasciculis florum dissitis. Flores rubro-purpurei, 5 lin. longi.

Hab. North Brazil (*Spruce*, n. 1726).

36. L. floribundus (*Benth. in Ann. Nat. Hist.* iii. p. 432, *et in Mart. Fl. Bras. Leg.* ined.), foliolis sub-7 ovatis oblongisve acuminatis coriaceis supra glabriusculis nitidis subtus tenuiter sericeis, racemis elongatis, floribus fasciculatis, vexillo sericeo, alis carinaque leviter falcatis, ovulis 2, leguminis glabri sutura vexillari leviter dilatata.—*L. Nicou*, DC. Prod. ii. p. 261, excl. syn. Aubl.—Foliola 2–4-pollicaria. Racemi subpedales. Flores violacei, 5–6 lin. longi.

Hab. Cayenne; British Guiana (*Schomburgk*, 1st coll. n. 238); and Tropical Brazil (*Gardner*, n. 2118; Santarem, *Spruce*).

The *Robinia Nicou* of Aublet is a doubtful plant; the specimen in the Banksian Herbarium consists but of a single leaf, which is more like that of *L. rufescens*; but he describes the stamens as diadelphous.

37. L. nitidulus (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis sub-9 ovali-oblongis acuminatis supra glabris subtus rufo-sericeis, racemis elongatis, floribus fasciculatis, vexillo sericeo, alis carinaque leviter falcatis, ovulis 2, legumine fulvo-sericeo, sutura vexillari ad semina leviter dilatato.—Foliola 2–3-pollicaria. Racemi 1–1½-pedales. Flores rosei, circa 5 lin. longi.

Hab. North Brazil and Venezuela, on the upper Rio Negro and Casiquiare (*Spruce*, n. 3203).

It may perhaps prove to be a variety of *L. floribundus*, although at first sight it has more the aspect of *L. rufescens* and *L. negrensis*, from both of which it differs much in the pod.

β? *Schomburgkii*, foliolis longioribus (circa 4 poll.) subtus petiolis racemisque laxius rufo-pubescentibus.

Hab. British Guiana, *Rob. Schomburgk*, 2nd coll. n. 733, *Rich. Schomburgk*, n. 1111.

38. L. negrensis (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 7–9 ovali-oblongis acuminatis supra glabris subtus tenuiter rufo-sericeis, racemo elongato, floribus fasciculatis, vexillo glabro, alis carinaque

leviter falcatis, ovulis 2, legumine tomentello, sutura vexillari carinato-subalata nec dilatata.—Foliola 3–4-pollicaria v. maxima semipedalia. Racemi 1–1½-pedales. Flores 6 lin. longi.

Hab. North Brazil and Venezuela, on the Rio Negro and Uaupès (*Spruce*, n. 1671, 2347 and 2537).

39. L. BARTERI, sp. n., foliolis 5–7 ovalibus oblongisve acuminatis glabris, racemis elongatis basi subramosis fusco-tomentellis, floribus fasciculatis, vexillo tenuiter sericeo ecalloso, alis carinaque rectiusculis, ovulis 5–6.—Frutex alte scandens, primo intuitu *L. rufescenti* et *L. nitidulo* similis, distinguitur imprimis foliolis subtus glaberrimis v. rarius ad costam subtilissime puberulis. Foliola 5–6 poll. longa, fere 3 poll. lata, inferiora cujusve folii multo minora, chartacea, utrinque viridia. Racemi ultrapedales, fasciculis inferioribus interdum in ramulos breves abeuntibus; superioribus nodiformibus. Flores rosei, demum purpurascentes, 6–7 lin. longi. Vexillum late obovatum v. suborbiculatum, basi in unguem angustatum, ecallosum.

Hab. West Tropical Africa, at Nupe on the Niger, *Barter*.

40. L. RUFESCENS (*Benth. in Tayl. Ann. Nat. Hist.* iii. p. 432), foliolis 9 amplis oblongo-ellipticis acuminatis supra glabris subtus rufo-sericeis, racemis elongatis, floribus fasciculatis, vexillo leviter sericeo ecalloso, alis carinaque leviter incurvis, ovulis circa 6, legumine plano tenui puberulo suturis tenuibus nudis.—Foliola 4–5-pollicaria v. maxima usque ad 7–8 poll. longa, acumine longiusculo. Racemi 1–1½-pedales, rigiduli, fasciculis dissitis. Flores penduli, rosei, 6 lin. longi. Legumen monospermum 2½ poll. longum 1¼ poll. latum, pleiospermum (quod non vidi) verosimiliter elongatum.

Hab. British Guiana, *Parker, Schomburgk*, 1st coll. n. 745.

The single leaf of Aublet's *Robinia Nicou* preserved in the Banksian Herbarium resembles this more than any other species.

41. L. SPRUCEANUS (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 9–13 ovali- v. oblongo-ellipticis acuminatis subtus canescentibus tenuissime sericeis, racemis infrafoliaceis folio sublongioribus, floribus fasciculatis, vexillo sericeo, alis carinaque valde arcuatis, ovulis 8–10. —Differt a *L. densifloro* imprimis floribus subdimidio minoribus. Foliola 1½–2-pollicaria. Racemi 6–10-pollicares, florum fasciculis approximatis. Flores circa 5 lin. longi, violaceo-purpurei. Legumen ignotum.

Hab. North Brazil, near Santarem, *Spruce*.

42. L. DENSIFLORUS (*Benth. in Tayl. Ann. Nat. Hist.* iii. p. 433), foliolis 7–9 ovali- v. oblongo-ellipticis acuminatis supra glabris subtus pallidis tenuissime sericeis, racemis infrafoliaceis folio vix longioribus, floribus fasciculatis, vexillo tenuiter sericeo, alis carinaque valde arcuatis, ovulis circa 8, legumine plano tenui, sutura vexillari anguste carinata.—Foliola bipollicaria. Racemi semipedales. Fasciculi florum

approximati v. demum subdissiti. Flores 7 lin. longi, violacei v. lilacini. Legumen junius tantum vidi, 1–3-spermum.

Hab. British Guiana, *Schomburgk*, 1st coll. n. 52.

β, *Moritzianus*, foliis floribusque majoribus, racemis longioribus.

Hab. Columbia, *Moritz.*, n. 880.

43. L. GLABRESCENS (*Benth. in Kew Journ. Bot.* ii. p. 233, *et in Mart. Fl. Bras. Leg.* ined.), foliolis 9 ovali-oblongis breviter acuminatis supra glabris subtus minute puberulis, racemis elongatis axillaribus terminalibusque, floribus fasciculatis, vexillo puberulo, alis carinam valde arcuatam æquantibus, ovulis 8–10, legumine elongato coriaceo suturis nudis.—Foliola pleraque sub-3-pollicaria. Racemi pedales et longiores, fere a basi floribundi.

Hab. North Brazil.

In flower this species is scarcely to be distinguished from *L. densiflorus* but by the somewhat larger leaflets, and the much longer racemes either axillary or terminating the short leafy branches, instead of arising from the leafless part of the older wood, as in *L. densiflorus.* The pod, however (if Martius' fruiting specimens be correctly matched with the flowering ones), is very different; being thick and coriaceous, with a tendency to separate transversely between the seeds, almost as in *Hedysareæ.*

44. L. COSTATUS (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 9–13 oblongis breviter acuminatis supra glabris subtus discoloribus subpubescentibus, racemis folio vix longioribus axillaribus terminalibusque, floribus fasciculatis confertis, vexillo rufo-sericeo, carina arcuata, ovulis 6–8.—Foliola 2–3-pollicaria. Racemi semipedales. Flores fere sessiles, reflexi, violacei, 4–5 lin. longi. Legumen ignotum.

Hab. South Brazil, prov. Minas Geraes.

45. L.? FASCICULATUS, sp. n., foliolis 7–9 oblongis brevissime acuminatis glabris subcoriaceis, panicula ampla ramis divaricatis, floribus nodoso-fasciculatis parvis, vexillo oblongo glabro ecalloso, alis carinaque rectiusculis, ovulis 2.—Frutex in summas arbores altissimas scandens. Foliola 3–4-pollicaria, chartacea v. demum coriacea, venis primariis a costa divergentibus paucis subtus valde prominentibus. Panicula ultrapedalis, ferrugineo-tomentosa, ramulis 3–5-pollicaribus. Fasciculi dense floribundi, secus ramulos dissiti. Flores sessiles, odoratissimi, circa 4 lin. longi. Calyx distincte 4-dentatus. Petala tenuia, angusta. Legumen ignotum.

Hab. Senegambia, *Heudelot*, n. 693.

In this and the following species the calyx and vexillum are much narrower than in the rest of the genus, and the pod is as yet unknown. They may, therefore, have to be hereafter excluded, but in all other respects they agree with *Lonchocarpus.*

46. L.? BRACHYPTERUS, sp. n., foliolis subquinis obovatis orbiculatisve breviter acuminatis supra glabrescentibus subtus molliter canescenti-tomentosis, racemis subramosis cano-tomentosis, floribus fasciculatis,

petalis rigidulis glabris, vexillo oblongo, alis carina brevioribus, ovulis 2.—Frutex alte scandens. Foliola 3–5-pollicaria, mollia, apice rotundata v. truncata, acumine abrupto brevi. Racemi pedales et longiores, fasciculis florum approximatis subsecundis. Flores subsessiles, odoratissimi, roseo-albi, fere 7 lin. longi. Calyx anguste campanulatus, cano-tomentosus. Petala erecta, diu persistentia. Vexillum ecallosum, basi auriculis parvis inflexis appendiculatum. Alæ carina angustiores et triente breviores, more generis supra unguem carinæ cohærentes. Stamina generis. Ovarium longiuscule stipitatum. Legumen ignotum. *Hab.* Senegambia, in the Fouta Dhallion, *Heudelot*, n. 828.

In its general aspect, round cottony leaves, and stiff narrow petals, this plant bears a considerable resemblance to an unpublished Mexican one (*Andrieux*, n. 441; *Bates*), which, however, I do not venture now to describe, as it has the tenth stamen entirely free, and the form assumed by the growing ovary, somewhat different from that of *Lonchocarpus*, renders it impossible to fix its genus until the more perfect fruit shall have been examined.

Doubtful Species.

L. roseus, DC., from the fragments that I saw, did not appear to differ much from *L. sericeus*, but neither the specimens nor description are sufficient to make it out.

L. hedyosmus, Miq. Linn. xviii. p. 564, is also probably not distinct from *L. sericeus*.

L. sepium, DC., *L. maculatus*, DC., and probably also *L. pubescens*, DC., belong to Kunth's genus *Gliricidia*, closely allied to *Millettia* and *Wisteria* among *Galegeæ*.

XV. Derris, *Lour.*

Pongamiæ et Dalbergiæ, sp. *DC. et Auct. Plur.*, Brachypterum, *W. et Arn.*, Aganope, *Miq.*

Calyx truncatus v. brevissime 4–5-dentatus. Alæ supra unguem carinæ leviter cohærentes. Carinæ petala dorso superne leviter cohærentia. Stamen vexillare ima basi liberum, dein cum cæteris in tubum completum connatum, rarius omnino liberum. Antheræ versatiles. Ovarium bi-pluri-ovulatum. Legumen planum, orbiculare, oblongum v. elongatum, membranaceum coriaceum v. rarius sublignosum, indehiscens, stylo terminali, sutura vexillari v. utraque ala angusta marginata. Semina, si plura, dissita. Radicula inflexa.—Caulis lignosus, alte scandens v. rarissime arboreus. Folia alterna, foliolis oppositis cum impari distante, exstipellata. Racemi subsimplices v. paniculati. Pedicelli fasciculati v. fasciculi rhachi elongata racemoso-sparsi. Flores violacei, purpurei v. albi, nec lutei, petalis (excepta *D. elliptica*) glabris. Calyx peracta anthesi sæpius cyathiformis. Genus a *Lonchocarpis fasciculifloris* non differt nisi leguminis ala.

Sect. 1. Brachypterum, *W. et Arn.* Vexillum basi nudum. Stamina monadelpha. Legumen tenue, angustum, utrinque acutatum, sutura

vexillari anguste alata. Pedicelli secus racemos subsimplices fasciculati, fasciculorum rhachi nodiformi v. rarius rhaches in racemulos elongantur et inflorescentia in paniculam irregularem transformatur. Species aliæ scandentes, aliæ arboreæ.

* *Racemosæ.*

1. D. scandens. (India, Archipelagus, China austr.)
2. D. robusta. (India.)
3. D. chinensis. (China austr.)
4. D. polyphylla. (Java.)
5. D. Cumingii. (Ins. Philippinæ.)
6. D. parviflora. (Ceylon.)

** *Paniculatæ.*

7. D. floribunda. (Java.)
8. D. laxiflora. (Formosa.)
9. D. paniculata. (Ceylon.)

Sect. 2. EUDERRIS. Vexillum basi nudum. Stamina monadelpha (in Americanis rarius subdiadelpha). Legumen tenue v. coriaceum, latum v. latiusculum, apice sæpius obtusum v. abrupte mucronato-acuminatum, sutura vexillari alata. Inflorescentia *Brachypteri*. Species omnes scandentes.

* *Americanæ.*

10. D. guianensis. (America trop.)
11. D. negrensis. (Brasilia sept.)
12. D. longifolia. (Brasilia sept.)

** *Asiaticæ.*

13. D. uliginosa. (Africa orient., India, Archipelagus, China austr.)
14. D. multiflora. (Archipelagus Indicus.)
15. D. Korthalsiana. (Archipelagus Indicus.)
16. D. javanica. (Java.)
17. D. acuminata. (India sept.)
18. D. elegans. (Burma.)
19. D. pubinervis. (Timor.)

Sect. 3. DIPTERODERRIS. Vexillum basi nudum. Stamina monadelpha. Legumen coriaceum, rarius tenue, latiusculum v. latum, sutura utraque alata (ala carinali rarius hinc inde evanida). Inflorescentia nunc *Brachypteri*, nunc sæpius, fasciculorum rhachibus elongatis, irregulariter paniculata. Species omnes scandentes.

20. D. ferruginea. (Ind. v. Burma.)
21. D. Heyneana. (Peninsula Indica.)
22. D. amœna. (Burma.)
23 D. Scanogheana. (Timor.)

24. D. marginata. (India sept.)
25. D. discolor. (India sept.)

Sect. 4. PARADERRIS, *Miq*. Vexillum basi bicallosum. Stamina monadelpha. Legumen coriaceum, latum v. latiusculum, sutura vexillari alata. Florum fasciculi secus racemos subsimplices pedunculati (pedunculi apice bi-pluri-flori). Species omnes scandentes. Foliola dissite pennivenia.

26. D. elliptica. (Archipelagus Indicus.)
27. D. cuneifolia. (India sept.; Malacca.)
28. D. oblonga. (Peninsula Indica; Ceylon.)
29. D. montana. (Java.)
30. D. microptera. (India sept.)

Sect. 5. AGANOPE, *Miq*. (ex parte). Vexillum basi nudum. Stamen vexillare ab initio liberum. Legumen coriaceum, latum, sutura vexillari v. sæpius utraque alata. Racemi thyrsoideo-paniculati (fasciculorum rhachibus omnibus in ramulos sparsifloros excurrentibus).

31. D. sinuata. (Ceylon, Burma, Malacca.)
32. D. polystachya. (India sept.)
33. D. thyrsiflora. (India orient., Archipelagus.)
34. D. macrophylla. (Java.)

Sect. 1. BRACHYPTERUM.

1. **D. SCANDENS**, scandens, foliolis 9–13 oblongis tenuiter subcoriaceis obtusis muticis retusisve glabris v. subtus minute pilosulis, racemis elongatis simplicibus, floribus nodoso-fasciculatis, ovulis 6–8, legumine elongato-lanceolato utrinque acutato, hinc anguste alato.—*Dalbergia scandens*, Roxb. Pl. Corom. t. 192, DC. Prod. ii. p. 217, Wight, Ic. t. 275; *Brachypterum scandens*, W. et Arn.; *Dalbergia Timorensis*, DC. Prod. ii. p. 417; *Pongamia coriacea*, Grah. in Wall. Catal. n. 5905; *Dalbergia venusta*, Zippel in Linnæa, xv. p. 197, ex Miq.; *Dalbergia robusta*, Miq. Pl. Hohen. exs. n. 103 non Roxb.—Foliola vulgo 1½–2-pollicaria, apice rotundata v. breviter et obtuse acuminata, secus petiolum brevem approximata, rigidiora quam in *D. robusta*; variant longiora et laxiora, v. pollice breviora et inferiora fere orbiculata, nitida v. opaca. Racemi 4–6-pollicares v. interdum fere pedales. Fasciculi 3–6-flori, rhachi nodiformi v. rarius in ramulum 1–2 lin. longum excurrente. Pedicelli filiformes, 2–4 lin. longi. Bracteolæ parvæ, orbiculatæ. Flores variant 4–6 lin. longi. Ovarium pilosulum. Legumen monospermum 1½-pollicare, pleiospermum 3-pollicare v. interdum longius, 5–6 lin. latum, glabrum v. minute puberulum.

Hab. Southern Asia, Ceylon, and the Peninsula, up to Bombay, in the plains of Central India, Chittagong, *Wallich, Hooker and Thomson*; Burma and the Indian Archipelago to Timor and North Australia, *F. Müller, Bidwill*; and northward to the Philippines, *Cuming*, n. 1699 and 1844; and South China, *Millett*.

The *Dalbergia elliptica*, Spanoghe, referred here by Miquel, seems to me to read more like the *Dalbergia volubilis*, Roxb., with the pod inaccurately described.

2. D. ROBUSTA, arborea, foliolis 13–21 oblongis ellipticisve mucronulatis novellis sericeis demum glabrescentibus membranaceis, racemis elongatis simplicibus, floribus nodoso-fasciculatis, ovulis 6–8, legumine elongato-lanceolato utrinque acutato hinc anguste alato.—*Dalbergia robusta*, Roxb., DC. Prod. ii. p. 417, Wight Ic. t. 244; *D. Krowei* (v. *Crowei*), Roxb., Fl. Ind. iii. p. 229.—Foliola quam in *D. scandente* pallidiora, subtus sæpe canescentia, et semper mucronulata, raro 1½ poll. excedunt et sæpius anguste oblonga; rarius latiora et fere ovata v. obovata. Inflorescentia et flores *D. scandentis*. Legumen angustius, monospermum circa 1¼ poll., pleiospermum usque ad 2–2½ poll. longum.
Hab. East India, hilly districts; Ceylon, *Macrae, Gardner*, n. 246; Peninsula, *Stocks*; Assam, *Griffith*; Khasiya and Chittagong, *Hooker and Thomson*.

3. D. CHINENSIS (*Benth. Fl. Hong-Kong, MS.*), arborea?, foliolis 13–19 oblongis ellipticisve obtusis v. acutiusculis muticis novellis sericeis demum glabrescentibus membranaceis, racemis folio subbrevioribus simplicibus, floribus nodoso-fasciculatis, ovulis 2, legumine oblongo utrinque acutato hinc angustissime alato.—Primo intuitu *D. robustam* refert sed foliola non mucronata et ovula in medio ovario 2, nec plurima infra medium sita. Foliola circiter pollicem longa. Racemi sub 4-pollicares. Nodi 2–4-flori. Flores 4–5 lin., pedicello vix lineam excedente. Legumen (in specimine Oosimensi) 1 poll. v. paullo longius, medio 6 lin. latum, monospermum, glabratum, ala angustissima, sutura utrinque nervo elevato marginata at non dilatata ut in *D. Cumingii*.
Hab. South China; Hong-Kong, *Hance*; Oosima Island, *Wright*.

I have only seen Wright's specimens in fruit, and Hance's in flower; there must, therefore, still remain some doubt, until they shall have been seen both in flower and fruit from the same locality.

4. D. POLYPHYLLA, foliolis 17–23 oblongo-ellipticis sublanceolatisve acutis supra glabris subtus sericeo-puberulis, racemis folio subbrevioribus simplicibus, floribus nodoso-fasciculatis (ovulis pluribus?), legumine elongato-lanceolato utrinque acutato hinc anguste alato.—*Brachypterum polyphyllum*, Miq. Fl. Ned. Ind. i. p. 139.—Habitus, inflorescentia, et legumen *D. scandentis*, sed foliola numerosa et acutiora. Legumen 2–3-spermum, usque ad 3 poll. longum.
Hab. Java, *Horsfield*.

I have only seen a single fruiting specimen, which appeared to me to be sufficiently distinct from the common *D. scandens*.

5. D. CUMINGII, sp. n., arborea?, foliolis 7–17 oblongis submucronulatis novellis sericeis demum glabrescentibus membranaceis, racemis

folio subbrevioribus simplicibus, floribus nodoso-fasciculatis, ovulis 2, legumine lineari-oblongo utrinque acutato cano-sericeo, sutura vexillari suberoso-dilatato angusteque alato.—Foliola fere *D. Chinensis* sed costa sæpius in mucronulam excurrit, foliorum superiorum acuta, inferiorum obtusissima. Racemi 3–4-pollicares, novelli sericei. Bracteæ longe subulatæ, in racemo juniore carnosæ, mox deciduæ. Flores quam in *D. Chinensi* minores. Legumen monospermum, 1¼ poll. longum, fere 4 lin. latum inclusa ala ¾-lineari, pube adpressa sericea canescens, sutura vexillari fere ut in *Lonchocarpis Neuroscaphis* dilatata.

Hab. Philippine Islands, *Cuming*, n. 1208.

6. D. PARVIFLORA, scandens, glabra, foliolis 7–9 ellipticis v. oblongis brevissime acuminatis membranaceis subtus subglaucescentibus, racemis folio subbrevioribus simplicibus, floribus nodoso-subfasciculatis, ovulis 2, legumine lineari apice oblique apiculato hinc alato glabro.—*Brachypterum elegans*, Thw. Enum. Pl. Ceyl. p. 93 (non *Derris elegans*, Benth.).—Tota glaberrima. Foliola 1¼–2 poll. longa. Racemi in specimine 2–3-pollicares v. (ex Thwaites) folia (4-pollicaria) æquantes. Pedicelli 2 lin. longi. Nodi pauciflori, inferiorum rhachis paullulum elongata. Flores circa 3 lin. longi. Calyx siccitate nigricans. Legumen ex Thw. 1¾–2¾ poll. longum, 6 lin. latum.

Hab. Ceylon, *Thwaites*.

7. D. FLORIBUNDA, scandens, foliolis 5 ovato-oblongis obtuse acuminatis glabris præter costam subtus aveniis, paniculis lateralibus multifloris, floribus parvis fasciculatis, staminibus monadelphis.—*Brachypterum floribundum*, Miq. Fl. Ned. Ind. i. p. 139.—Foliola 2½–3½-pollicaria. Paniculæ villosulæ, semipedales. Flores vix 3 lin. longi.

Hab. Java, *Horsfield*.

The pod being unknown, the affinities of this species are uncertain, but it seems to be nearly allied to the two following.

8. D. LAXIFLORA, sp. n., scandens, foliolis sub-5 oblongis obtusis subcoriaceis nitidulis glabris, paniculis elongatis laxifloris nodis elongato-racemiformibus, ovulis in medio ovario circa 4.—Foliola fere *D. scandentis*, sed pleraque majora et rigidiora, utrinque nitida et viridia. Panicula ½–1-pedalis, basi ramo uno alterove elongato instructa, ramulis cæteris brevibus (fasciculorum rhaches elongatæ). Pedicelli sparsi, 3–4 lin. longi. Flores semipollicares. Legumen non visum.

Hab. Formosa, north-west coast, *Wilford*.

The fruit being unknown, the exact relation of this species also is uncertain, but it seems to be nearly allied to the last and the next, except that the flowers are nearly twice the size.

9. D. PANICULATA, scandens, foliolis 5–7 oblongis obtusis subcoriaceis glabris, panicula terminali ampla ramosissima adpresse pubescente

ramulis gracilibus, floribus parvis, ovulis circa 4, staminibus monadelphis, legumine oblongo hinc alato.—*Brachypterum Benthamii*, Thw. Enum. Pl. Ceyl. p. 93.—Foliola quam in *D. scandente* majora, pleraque 2–3-pollicaria, maxima usque ad 4¼ poll. longa, 2 poll. lata, obtusa v. breviter et obtuse acuminata nec mucronata, petiolulo 1½–2 lin. longo. Inflorescentia pube minima sericeo-rufescente vestita, irregulariter paniculata; fasciculorum rhaches pleræque in ramulos graciles sparsifloros abeunt, superiores sæpe abbreviatæ, 2–3-floræ. Pedicelli vix lineam longi. Flores vix 3 lin. longi, cæterum iis *D. scandentis* similes. Legumen (ex Thwaites) 1–1¾ poll. longum, 6–7 lin. latum. Species ulterius comparanda cum formis nonnullis sub *D. Heyneana* enumeratis quarum legumen ignotum.

Hab. Ceylon, *Walker*; also Thwaites, whose specimens, however, I have not seen.

This and the two preceding species differ from the other *Brachyptera* in their inflorescence, which is nearer to that of some *Dipteroderrides*, and possibly, when better known, will have to be removed into that section, next to *D. Heyneana*.

Sect. 2. Euderris.

* *Americanæ.*

10. D. guianensis (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis sub-5 ovatis v. ovali-oblongis acuminatis basi rotundatis coriaceis glabris supra nitidis subtus pallidis v. glaucescentibus, racemis floribundis rufo-pubescentibus simplicibus, pedicellis fasciculatis, legumine oblongo-lineari tenui acutiusculo hinc alato.—*Deguelia scandens*, Aubl. Pl. Gui. p. 750, t. 300, quoad specim. florid. excl. leg.; *Lonchocarpus pterocarpus*, DC. Prod. ii. p. 260.—Alte scandens. Foliola 3–5-pollicaria v. maxima usque ad 7 poll. longa, 4 poll. lata. Racemi axillares v. laterales, 4–8-pollicares, a basi floribundi. Flores 4–5 lin. longi. Ovula 2. Legumen sessile, monospermum 2–3-pollicare, 2-spermum 4–5-pollicare, circa 9 lin. latum, inclusa ala 1¼ lin. lata.

Hab. Tropical America, Cayenne, *Aublet, Perrottet*; Surinam, *Wallschnagel*, n. 839, also *Kegel*, 1174 (*Miquel*); British Guiana, *Rob. Schomburgk*, 1st coll. n. 564, 2nd coll. n. 953; *Rich. Schomburgk*, n. 1317.

Aublet's flowering specimens in the British Museum certainly belong to this species, although his figure even of the flowering plant is not a very good representation of it, and the fruit, evidently mismatched, is precisely that of the *Müllera moniliformis* when reduced to a single seed. The *D. guianensis*, in the shape of the pod, comes as near to the section *Brachypterum* as to *Euderris*, but I have placed it in the latter on account of the very close resemblance of the whole plant to the two following species.

11. D. NEGRENSIS (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis sub-5 ovatis v. ovali-oblongis acuminatis basi rotundatis coriaceis supra glabris nitidis subtus pilis minutis conspersis, racemis floribundis ferrugineo-tomentosis simplicibus, pedicellis fasciculatis, legumine ovali coriaceo obtuso hinc alato.—Specimina florida a *D. guianensi* vix distinguenda nisi forte pube paginæ inferioris foliolorum; racemi etiam sæpius longiores et laxiores et flores paullo majores potius ochroleuci dicuntur quam albi. Legumen distinctissimum, 1½–2 poll. longum, 1–1½ poll. latum, apice rotundatum vix apiculatum, rigide coriaceum, minute subglauco-puberulum.

Hab. North Brazil (*Spruce*, n. 1906 & 1926).

12. D. LONGIFOLIA (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis sub-5 oblongis acuminatis basi angustatis coriaceis supra glabris nitidis subtus pilis minutis conspersis, racemis floribundis ferrugineo-tomentosis simplicibus, pedicellis fasciculatis, legumine ovali membranaceo juniore rufo-velutino.—Præcedentibus legumine excepto valde affinis. Foliola angustiora, vulgo 3–4 poll. longa, 1½ poll. lata, maxima 7 poll. longa, 2 poll. lata. Flores 5–6 lin. longi, ochroleuci. Stamen vexillare sæpius liberum v. medio cum cæteris leviter cohærens. Ovula 2. Legumen fere *D. uliginosæ*, nisi pubescens, 1½–2 poll. longum, 1–1½ poll. latum.

Hab. North Brazil, *Spruce*, n. 1169.

** *Gerontogeæ.*

13. D. ULIGINOSA (*Benth. in Pl. Jungh.* i. p. 252), scandens, glabra, foliolis 3–7 ovatis v. ovali-oblongis acuminatis, racemis axillaribus lateralibusve subsimplicibus, pedicellis fasciculatis calyce non longioribus, staminibus monadelphis, ovulis ad basin ovarii plurimis, legumine oblique ovali v. orbiculato 1–2-spermo plano tenui glabro hinc anguste alato.—*Pongamia uliginosa*, DC. Prod. ii. p. 416; *Derris Forsteniana*, Miq. Fl. Ned. Ind. i. p. 144 ex descr.—Foliola 1½–2-pollicaria, acumine brevi obtuso, tenuiter coriacea, nitidula. Racemi 2–3-pollicares v. summi semipedales. Florum fasciculi dissiti, rhachi nodiformi v. parum elongata, raro ramulum semipollicarem formante. Pedicelli floridi circa 1 lin., flores 4 lin. longi. Calyx sæpe coloratus, glaber v. minute puberulus. Ovarium pubescens v. glabratum. Ovula sæpius 6–8, omnia infra medium ovarii. Legumen 1–1½-pollicare, nunc æque latum ac longum, nunc fere dimidio angustius apice basique obtusissimum v. retusum. Semina 1–2, reniformia.

Hab. Southern Asia. Common in East India, from Ceylon and the Peninsula, over the plains of Central India, to Khasiya, *Hooker & Thomson*, and Burma, *Wallich*; extending eastward over the Indian Archipelago to the Isle of Pines, *Macgillivray*; Tongatabou, *Amer. Expl. Exped.*; North-west Australia, Fitzmaurice River, *F. Müller*;

northward to Loochoo, *Wright*, and South China; and westward to Madagascar, *Bojer*; and eastern Africa, Luabo River, *Livingstone*.

β, *Loureiri*, foliolis 3–5, racemis elongatis, ovario glabriore, ovulis sæpius 4 (infra medium ovarii sita, ut in forma normali).—*Derris trifoliata*, Lour. Fl. Cochinch. p. 433; *D. affinis*, Benth. Pl. Jungh. i. p. 252 in adnot.

Hab. China, *Millett*; Cochinchina, *Loureiro*, *Gaudichaud*; Malacca, *Griffith*.

14. D. MULTIFLORA (*Benth. Pl. Jungh.* p. 253), scandens, foliolis sub-5 ovatis oblongisve obtuse acuminatis ramulisque subglabris, racemis lateralibus floribundis subsimplicibus ferrugineo-pubescentibus, pedicellis fasciculatis calyce longioribus, staminibus monadelphis, ovulis in medio ovario circa 3, legumine "oblique rotundato."—Foliola in forma normali fere *D. uliginosæ*, a qua hæc species differt racemis pubescentibus floribundis, pedicellis longioribus et præsertim ovulis in medio ovario dissitis nec ad basin approximatis. Legumen ipse non vidi.

Hab. Java, *Junghuhn*.

β? *longifolia*, foliolis 3–4 poll. longis, 1–1¼ poll. latis.

Hab. Philippine Islands, *Cuming*, n. 1162.

Without the fruit it is difficult to judge of the precise affinities of these specimens.

15. D. KORTHALSIANA (*Miq. Fl. Ned. Ind.* i. p. 143), glabra, foliolis 5 ellipticis v. elliptico-oblongis obtusis coriaceis subtus prominente penniveniis et reticulato-venulosis, racemis axillaribus lateralibusque confertis folio subbrevioribus, floribus parvis, calyce pubescente, legumine (juniore) late elliptico membranaceo pubescente hinc angustissime alato.—Foliola 2–4 (vulgo 3½) poll. longa, 9–17 lin. lata, apice attenuato-emarginata, breviter petiolulata. Rami florentes haud raro crassi. Racemi 3–5-pollicares. Pedicelli hirsutuli. Flores circa 2 lin. longi.

Hab. Borneo, *Korthals*; the Moluccas (*Miquel, l. c.*).

I have not seen this species. It appears to differ from *D. uliginosa* in its much larger leaflets, and in the flowers, which are smaller than in any species known to me. The ovary is not described.

16. D. JAVANICA (*Miq. Fl. Ned. Ind.* i. p. 143), scandens, foliolis 5 ovatis v. ovali-oblongis breviter acuminatis glabris præter costam subaveniis, racemis axillaribus subsimplicibus, legumine oblongo obtuso plano tenui glabro hinc latiuscule alato.—Folia *D. uliginosæ*, sed legumen plus duplo longum quam latum.

Hab. Java, *Horsfield*.

According to Miquel, this is near *D. Korthalsiana*. It is, however, described from a fruiting specimen only, which has the leaves of *D. uliginosa*, but a very much narrower pod.

17. D. ACUMINATA (*Benth. Pl. Jungh.* i. p. 252 in adnot.), glabriuscula, scandens, foliolis 7–11 oblongis acuminatis submembranaceis reticulato-venosissimis, racemis elongatis subramosis puberulis, pedicellis fasciculatis calyce paullo longioribus, vexillo nudo, ovulis 5–6 dissitis.—*Pongamia elongata*, Grah. in Wall. Catal. n. 5886, non 5915*; *P. acuminata*, Grah. *l. c.* n. 5901.—Foliola vulgo 3–4 poll. longa 1–1½ poll. lata, longiuscule acuminata, adulta subchartacea, subtus pallidiora elevato-pennivenia et creberrime reticulato-venulosa. Racemi infrafoliacei v. laterales rarius axillares, 4–8 poll. longi, tenuissime ferrugineo-puberuli. Flores purpurei, circa 6 lin. longi; fasciculorum rhaches nodiformes v. rarius in ramulos 2–3 lin. longos excurrentes. Pedicelli 2–3 lin. longi. Vexillum late ovatum, basi in unguem calycem æquantem attenuatum. Legumen non visum.

Hab. Nepaul, *Wallich*; Sikkim, *Hooker*.

18. D. ELEGANS (*Benth. in Pl. Jungh.* i. p. 252 in adnot.), foliolis 5–9 amplis ellipticis oblongisve membranaceis subtus ad costas petiolis ramulisque novellis hispidis, racemis lateralibus brevibus subsimplicibus, pedicellis fasciculatis v. inferioribus subracemosis calyce villoso longioribus, ovulis in medio ovario 4, legumine orbiculato v. oblongo tenui pubescente hinc alato.—*Pongamia elegans*, Grah. in Wall. Catal. n. 5883; *P. floribunda*, Grah. *l. c.* n. 5884.—Foliola pleraque 5–6-pollicaria, petiolulo abbreviato. Pubes ferruginea, laxa. Racemi 3–5-pollicares. Flores 6–7 lin. longi, fasciculorum inferiorum rhachis interdum in ramulum brevem excurrit. Legumen rufo-pubescens v. villosum, cæterum fere *D. uliginosæ*, 1–1½ poll. longum, 10–12 lin. latum.

Hab. Burma: Phonac and Trogla Hills, *Wallich*.

19. D. PUBINERVIS, ramulis ferrugineo-tomentosis, foliolis 11 elliptico-ovatis abrupte acuminatis basi rotundatis supra glabris nitidis subtus glaucescentibus parallele venosis ad venas pubescentibus, paniculis axillaribus folii longitudine, legumine ovato sutura anguste alata.—*Dalbergia pubinervis*, Span. Linnæa, xv. p. 197.—Caulis volubilis. Foliola opposita. Legumen monospermum pollicare.

Hab. Timor, *Spanoghe*.

I have not seen any specimen, but Spanoghe's character seems to indicate a *Derris* allied to *D. elegans*.

Sect. 3. DIPTERODERRIS.

20. D. FERRUGINEA (*Benth. in Pl. Jungh.* i. p. 252 in adnot.), foliolis 7–9 obovali-oblongis ellipticisve subacuminatis subtus ad venas elevatas petiolis ramulis inflorescentiaque ferrugineo-villosis, racemis elongatis

* *Pongamia elongata*, n. 5915, is a very doubtful species. With the leaflets rather longer than in *D. scandens*, it has a broad, rather thick pod, with a very narrow wing. There are no flowers to the only specimen in the collection.

ramosis, pedicellis subfasciculatis calyce villoso longioribus, ovario villoso, ovulis 4, legumine coriaceo tomentello hinc v. utrinque rigide alato.—*Robinia ferruginea*, Roxb. Fl. Ind. iii. p. 329; *Pongamia ferruginea*, Wall. Catal. n. 5885; *P. oblonga*, Wall. Catal. n. 5893 (folia). —Foliola 3–5-pollicaria, subtus elevato-pennivenia, inter venas sparse pilosula et sub lente punctata, supra glabra, nitidula. Paniculæ axillares, irregulariter ramosæ, fasciculorum rhachibus sæpe in ramulos breves excurrentibus. Pedicelli 2–3 lin. longi; flores circa 4 lin. Vexillum ovatum. Legumen monospermum 2-pollicare, 2-spermum 4-pollicare, rigide coriaceum, sutura vexillari lateraliter dilatata (utrinque nervo elevato aucta) dorso latiuscule rigideque alata, sutura carinali nunc nuda nunc sæpius anguste alata.

Hab. Eastern India: Silhet, *Wallich, Hooker & Thomson*; Assam, *Jenkins*; Burma, on the Attran river, *Wallich*.

21. D. Heyneana (*Benth. in Pl. Jungh.* i. p. 252 in adnot.), glabra v. tenuissime rufo-tomentella, foliolis 5–7 ovatis v. ovali-oblongis obtuse acuminatis coriaceis dissite penniveniis reticulatisve, paniculis gracilibus ramosis, pedicellis calyce paullo longioribus, legumine coriaceo utrinque alato.—*Pongamia Heyneana*, Grah., W. & Arn. Prod. i. p. 263; *P. paniculata*, Wight, Herb. n. 920.—Foliola 2–3 poll. longa, 1–2 poll. lata, nitidula, venis primariis rete venularum tenuissimo, petiolulo vix 2 lin. longo. Paniculæ floribundæ, ½–1-pedales; ramuli ultimi v. fasciculorum rhaches 3–6 lin. longi. Pedicelli 2 lin., flores circa 5 lin. longi. Ovarium puberulum, ovulis vulgo 4. Legumen glaberrimum, glaucum, 1-spermum 2-pollicare, 3-spermum 4-pollicare, fere 1 poll. latum inclusis alis latiusculis coriaceis.

Hab. East Indian peninsula, *Heyne*.

β, parviflora, glaberrima, floribus 4 lin. longis.

Hab. Concan, *Stocks*.

γ? brevipes, foliis glaberrimis, inflorescentia ferrugineo-tomentosa, fasciculorum rhachibus abbreviatis, pedicellis calyce sæpius brevioribus.—*D. ovalifolia* var.? *coriacea*, Benth. in Pl. Hohen. exs.

Hab. Concan, *Stocks*; Nilgherry Hills, *Hohenacker*, n. 1597 & 1598.

There is no fruit to these specimens, and I cannot tell whether they belong to the *D. paniculata* or to the present species.

22. D. amœna (*Benth. in Pl. Jungh.* i. p. 252 in adnot.), glabra, foliolis ovatis oblongisve obtuse acuminatis crebre parallele venosis, racemis fasciculato-subpaniculatis, pedicellis fasciculatis, ovario puberulo, ovulis 2, legumine coriaceo glaberrimo glauco hinc v. utrinque alato.—*Pongamia amœna*, Wall. Catal. n. 5912.—Foliola forma et consistentia iis *D. Heyneanæ* subsimilia, sed venæ primariæ a costa divergentes numerosæ, rete intermedia vix ulla. Racemi glaberrimi, simplices v. basi ramosi, 4–5-pollicares, floribundi. Rhaches fasciculorum nodiformes. Pedicelli 1–2 lin. longi; flores vix 3 lin. Legumen 1–2-spermum,

3–4-pollicare, circa pollicem latum, inclusis aliis, quarum vexillaris 1–2 lin. lata carinalis vix 1 lin. v. interdum evanida.

Hab. Moulmyne, *Wallich*; Mergui, *Griffith.*

23. D. Spanogheana (*Blume in Miq. Fl. Ned. Ind.* i. p. 142), glabra, foliolis 7–9 ellipticis v. ovali-ellipticis obtuse subacuminatis venis pluribus e costa subpatulis, paniculis axillaribus hirtellis, legumine late elliptico membranaceo utrinque alato.—Petioli communes 2–3½-pollicares. Foliola circa 3 poll. longa, 10–12 lin. lata, pergamaceo-chartacea. Paniculæ folium superantes, ex ima basi ramosæ, ramuli ultimi (fasciculorum rhaches) breves, pauciflori. Flores breviter pedicellati, circa 2 lin. longi. Legumen juvenile circa 1 poll. longum.

Hab. Timor, *Spanoghe.*

I have not seen this species, but from Miquel's description it must be near the *D. amœna.*

24. D. marginata (*Benth. in Pl. Jungh.* i. p. 252 in adnot.), glabra, foliolis 5–7 oblongis acuminatis nitidis, racemis subramosis gracilibus laxis, pedicellis filiformibus calyce 3–4-plo longioribus, ovario glabro, ovulis circa 6, legumine glabro oblongo vix coriaceo utrinque alato.—*Dalbergia marginata*, Roxb. Fl. Ind. iii. p. 241; Wight, Ic. t. 87; *Pongamia emarginata*, Wall. Catal. n. 5909, non 5896; *Aganope marginata*, Miq. Fl. Ned. Ind. i. p. 152—Foliola 3–5 poll. longa, 1–1½ v. rarius 2 poll. lata, coriacea, nitidula, tenuiter dissite pennivenia et reticulato-venulosa. Racemi folio breviores, rhachi gracillima. Pedicelli solitarii v. rarius 2–3, vix semipollicares. Flores 8–9 lin. longi, petalis longe unguiculatis. Legumen monospermum, 3–4 poll. longum, 1¼–1¾ poll. latum, ala vexillari sæpe 3 lin., carinali fere 2 lin. lata.

Hab. Khasiya, *Wallich, Hooker & Thomson.*

Readily known by its long slender pedicels and large thin pod.

25? D. discolor, sp. n., glabra, foliolis 5–9 cuneato- v. obovali-oblongis coriaceis subtus glaucis, racemis lateralibus vix ramosis, pedicellis apice 2–3-floris, legumine crasso-coriaceo glauco nitidulo utrinque alato.—Foliola 3–4-pollicaria, iis *D. cuneifoliæ* subsimilia nisi rigidiora; inflorescentia etiam *D. cuneifoliæ* sed legumen cum descriptione Roxburghiana istius speciei haud convenit; crasso-coriaceum est ut in *Pongamia*, sed durius et ut in cæteris *Derridibus* transverse reticulato-venosum. Sutura utraque anguste coriaceo-alata et utrinque juxta alam costa prominente percursa. Flores mihi desunt.

Hab. Khasiya, *Hooker & Thomson*; Sikkim, lower hills, and Terai, *Hooker.*

This species has the inflorescence of *Paraderris*, with the pod of *Dipteroderris.*

Sect. 4. Paraderris.

26. D. elliptica, molliter rufo-pubescens, foliolis 7–13 elliptico- v. cuneato-oblongis obovatisve submembranaceis, racemis laxis, pedun-

culis apice plurifloris, vexillo sericeo basi biappendiculato, legumine subcoriaceo tomentello hinc anguste alato.—*Pongamia elliptica,* Wall. Pl. As. Rar. iii. p. 20, t. 237, Wight, Ic. t. 420; *Galedupa elliptica,* Roxb. Fl. Ind. iii. p. 242; *Pongamia volubilis,* Zoll. et Mor. Vez. p. 3; *P. dubia,* Grah. in Wall. Catal. n. 5899; *P. Horsfieldii,* Miq. Fl. Ned. Ind. p. 149 et (ex descr.) *P. hypoleuca,* Miq. *l. c.* p. 148.—Alte scandens, tota pube laxa in partibus novellis dense sericea in foliis adultis nonnunquam subevanida rufescit. Foliola 3–5-pollicaria, per anthesin membranacea, utrinque plus minus pubescentia, dissite pennivenia, acumine brevi obtuso, petiolulo brevi, adulta rigidiora et supra demum glabrescentia subtus rufescenti-subglauca. Racemi nunc breves, nunc 8–10-pollicares. Fasciculorum rhaches ipsæ brevissimæ sed pedunculo communi nunc 3–4 lin. nunc usque ad 1–1½ poll. longo fultæ. Pedicelli 2–3 lin. longi. Flores circa 10 lin. longi, in genere insignes vexillo ut in *Millettiis* plerisque extus dense rufo-sericeo. Ovarium villosum, ovulis 3–4. Stamina medio monadelpha. Legumen (quod rarius vidi) 1-spermum 1½-pollicare, 3-spermum 3–4-pollicare, circa 9 lin. latum, haud crasse coriaceum, ala raro 1 lin. lata.

Hab. Indian Archipelago, Amboyna, and Malay Islands, *Roxburgh*; Java, *Zollinger,* n. 315; Borneo (*Miquel,* l. c.); Siam, *Schomburgk*; Attran and Moolmyne, *Wallich.*

27. D. CUNEIFOLIA (*Benth. in Pl. Jungh.* i. p. 253 in adnot.), glabra, foliolis 5–7 (rarissime 9–11) oblongis subcuneatis obovatisve obtusis v. breviter acuminatis submembranaceis, racemis laxis brevibus subramosis, pedunculis apice 2–3-floris, vexillo glabro basi calloso, ovario villoso, ovulis 2, legumine "orbiculato acuminato."—*Galedupa marginata,* Roxb. Fl. Ind. iii. p. 241; *Pongamia marginata,* Wall. Catal. n. 5896; *P. cuneifolia,* Grah. in Wall. Catal. n. 5887; *P. obovata,* Wall. Catal. n. 5897.—Alte scandens. Foliola per anthesin 2–3-pollicaria, membranacea. Racemi 2–4-pollicares, infrafoliacei v. in ramulis per anthesin aphyllis subpaniculati. Pedunculi 2–4 lin., pedicelli vix 2 lin. longi. Flores 6 lin. longi. Vexillum basi callis 2 in ungue subdecurrentibus auctum. Legumen a Roxburghio descriptum ipse non vidi.

Hab. Northern India: Nepaul and Sillet, *Wallich*; Sikkim, lower hills, *Hooker.*

β, malaccensis, foliolis evidenter acuminatis, floribus fere 8 lin. longis, nec aliter diversa videtur.

Hab. Malacca, *Griffith.*

The same species is also indicated by Miquel as found in Celebes; I have not myself seen the specimens.

28. D. OBLONGA, glabra, foliolis 9–17 elliptico-oblongis subcuneatis v. terminali obovali-oblongo membranaceis, racemis lateralibus brevibus laxis, pedunculis brevibus apice 2–3-floris, vexillo glabro basi sub-

calloso, ovario pubescente, ovulis 3, legumine coriaceo ovali recurvo-mucronato hinc alato.—*D. ovalifolia*, var., Benth. Pl. Jungh. p. 252 in adnot.; Thw. Enum. Pl. Ceyl. p. 92, excl. syn. W. et Arn.—Valde affinis *D. cuneifoliæ*, differt foliolis numerosis angustioribus vulgo 1¼–2 poll. longis 6–9 lin. latis, floribus sæpius paullo minoribus, vexilli callis minus prominulis. Legumen 1½-pollicare, 9–11 lin. latum.

Hab. East Indian peninsula: Concan, *Stocks*; Ceylon, *Walker*, *Gardner*, n. 476, *Thwaites*.

The *Pongamia ovalifolia*, W. & Arn., according to Wight's figure, has not the peculiar inflorescence of the *Paraderris* section, and has differently shaped leaflets.

29. D. MONTANA (*Benth. in Pl. Jungh.* i. p. 253), glabra, foliolis 7–9 amplis oblongis acuminatis, racemis laxis vix ramosis, pedunculis apice sub-3-floris, vexillo glabro basi calloso, ovario tomentoso, ovulis circa 8. —*D. cuneifoliæ* affinis, differt foliis floribusque multo majoribus, ovulorum numero, &c. Foliola 4–5-pollicaria. Racemi semipedales v. breviores. Pedicelli circa 2 lin. longi, pedunculo communi 3–6 lin. longo fulti. Flores 9–10 lin. longi. Legumen ignotum.

Hab. Java, *Junghuhn.*

30. D. MICROPTERA, sp. n., glabra, foliolis 5–9 oblongis longe acuminatis membranaceis, racemis elongatis laxiusculis, pedicellis 2–3-nis sessilibus v. brevi-pedunculatis, vexillo glabro basi calloso, ovario pubescente, ovulis 4–6, legumine oblongo, sutura vexillari subdilatata et angustissime alata.—Habitu et vexillo calloso *D. cuneifoliæ* approximatur. Foliola subsimilia sed in acumen semipollicare abrupte producta. Racemi ½–1-pedales, glabri. Nodi floriferi nunc sessiles nunc pedunculo 1–2 lin. longo fulti. Pedicelli circa 3 lin. longi. Vexillum semipollicare. Legumen 2–4 poll. longum, 1 poll. latum, 1–3-spermum, tenue, reticulatum, ad suturam ut in *Lonchocarpo floribundo* et *L. nitidulo* leviter dilatatum; ala etiam nonnunquam evanescit, sæpius fere ½ lin. lata est.

Hab. Sikkim, *Hooker.*

This is one of those species which intimately connects *Derris* with *Lonchocarpus.*

Sect. 5. AGANOPE.

31. D. SINUATA (*Thw. Enum. Pl. Ceyl.* p. 93), glabra, foliolis 5–7 amplis ovatis suborbiculatisve coriaceis nitidis, panicula rigida terminali, stamine vexillari libero, legumine coriaceo rigido glaberrimo inter semina sinuato hinc alato.—*Pongamia sinuata*, Wall. Catal. n. 5911; *P. grandifolia*, Grah. in Wall. Catal. n. 5882, non Zoll. et Mor.—Foliola 3–5 poll. longa, 2–4 poll. lata. Racemi breves, in paniculam elongatam angustam terminalem dispositi. Pedunculi 1 2 lin. longi, 1–2-flori, pedicellis brevissimis. Rhachis et calyces tenuiter rufo- v. subcanescenti-tomentelli. Vexillum 6 lin. longum ut in *Para-*

derri reflexum, sed basi nec callosum nec auriculatum, in unguem latiusculum contractum. Stamen vexillare ab initio liberum. Ovarium vix puberulum, ovulis 5–6. Legumen sæpe falcatum, monospermum 2-pollicare, 4-spermum 8-pollicare, 1–1¼ poll. latum, tenuiter reticulatum, indehiscens, inter semina plus minus constrictum.

Hab. Ceylon, *Thwaites*; Martaban, Tavoy, and Singapore, *Wallich*; Malacca, *Griffith*.

32. D. POLYSTACHYA, sp. n., foliolis 5–7 ovatis oblongisve acuminatis subcoriaceis glabris nitidulis tenuiter penniveniis, paniculis pluribus subracemiformibus elongatis, ramulis abbreviatis, pedicellis sparsis calyce longioribus, stamine vexillari libero, legumine utrinque alato.—Foliola quam in *D. thyrsiflora* tenuiora et minus reticulata. Paniculæ racemiformes (v. rami primarii paniculæ subfoliatæ), plures, ½–1-pedales, floribundæ, ramulis (v. fasciculorum rhachibus elongatis) inferioribus ½–1-pollicaribus, summis interdum ad nodos floriferos reductis. Pedicelli 2–3 lin. longi. Flores semipollicares. Vexillum subsessile, ovatum, ecallosum. Stamen vexillare tenuiter puberulum. Ovarium pubescens, ovulis circa 4. Legumen junius utrinque alatum, perfectum non vidi.

Hab. Khasiya, *Hooker & Thomson.*

The *Pongamia secunda*, Grah. in Wall. Catal. n. 5890, from Goalpara, *Hamilton*, may possibly be the same species, with rather longer points to the leaves and rather smaller flowers; but I have seen neither the stamens nor the pod.

33. D. THYRSIFLORA, foliolis 7–11 obovatis oblongisve obtusis v. breviter acuminatis subcoriaceis glabris nitidulis reticulato-penniveniis, panicula elongato-thyrsoidea terminali rufo-tomentella, pedicellis brevissimis sparsis, stamine vexillari libero, legumine "utrinque alato."—*Millettia thyrsiflora*, Benth. in Pl. Jungh. p. 249 in adnot.; *Aganope floribunda*, Miq. Fl. Ned. Ind. i. p. 151.—Foliola nunc omnia 2–3½-pollicaria, nunc pleraque 4–6-pollicaria, subconcoloria. Panicula anguste pyramidata, ½–1-pedalis, solitaria v. basi in paniculas similes 2–3 divisa, ramulis a basi ad apicem decrescentibus sparsifloris. Flores 4–5 lin. longi, glabri, siccitate nigricantes. Vexillum nudum, ungue brevissimo. Ovarium plus minus villosum, ovulis 4. Legumen ipse non vidi; ex Miq. reticulatum est, 2½–3 poll. longum, 1 poll. latum, obtusum, monospermum, utrinque alatum.

Hab. Eastern India and the Archipelago: Khasiya and Malacca, *Griffith*; Penang, *Phillips*; Sumatra, *Miquel, l. c.*; Java, *Zollinger*, n. 808.

34. D. MACROPHYLLA, foliolis 3–5 amplis late ellipticis submembranaceis puberulis glabrescentibusque, paniculis folio subbrevioribus, pedicellis brevissimis, stamine vexillari libero (legumine utrinque alato?)—*Aganope macrophylla*, Miq. Fl. Ned. Ind. i. p. 152.—Præcedenti

proxima, sed folia majora, paniculæ minores, cum calycibus minus tomentellæ.

Hab. Java, *Blume* (*Miquel, l. c.*).

I have not seen this plant.

Doubtful Species.

Pongamia ovalifolia, W. et Arn. Prod.; Wight, Ic. t. 328, from the Peninsula, appears from the figure to have the foliage of the *Paraderris* section, with the inflorescence and flowers rather of *Euderris* or *Brachypterum*. I have not seen the specimen, and the fruit is unknown; so that it is impossible to define it accurately, or to judge of its affinities. The Peninsula and Ceylon plants I formerly referred to it are certainly distinct, and are above described as *Derris oblonga*.

Derris acuminata, Miq. Fl. Ned. Ind. i. p. 144 (non Benth.), from Java and Sumatra, and *D. pubipetala*, Miq. *l. c.* p. 145, from Java, differ from all other species except *D. elliptica* in their silky vexillum, and from that one in many particulars. The fruit is unknown in both; and from Miquel's description I should strongly suspect they may belong to *Millettia*. I have seen no specimens.

Pongamia corallaria, Miq., is taken up from a rude figure of Rumphius's. *Dalbergia rostrata*, Hassk., described by the author from leaves only, and which I thought might be those of *Derris uliginosa*, is enumerated by Miquel as a species of *Millettia*, with a note of doubt. This practice of publishing species from unintelligible figures or imperfect specimens without flowers or fruit or other means of future identification, far from contributing to the advancement of science, only serves to bewilder and confuse. Upon this principle I have passed by some *Pongamias* of Wallich's Catalogue, and other specimens, of which we have mere fragments, although apparently representing species of *Derris* distinct from any of the above.

XVI. Pongamia, *Vent.*

Galedupa, *Lam.*

Flos *Lonchocarpi*. Legumen oblongum, plano-compressum, crasse coriaceo-subcarnosum, indehiscens, monospermum, suturis obtusis nudis. Semen reniforme, crassiusculum, hilo parvo. Genus vix a *Lonchocarpo* distinctum.

Species unica.

P. glabra, *Vent., DC. Prod.* ii. p. 416; *P. grandifolia*, Zoll. et Mor. Verz. p. 3; Miq. Fl. Ned. Ind. i. p. 147 (ex descr.). Arbor. Folia alterna, glabra. Foliola 5–7, opposita cum impari distante, exstipellata, ovata, late elliptica v. suboblonga, breviter et obtuse acuminata, subtripollicaria, petiolulo 3–4 lin. longo; variant tamen interdum multo majora. Racemi laxi, 3–5-pollicares, tenuiter puberuli v. glabri. Pedicelli graciles, 2–4 lin. longi, gemini v. nodis 2 approximatis sub-4-ni.

Calyx late truncatus. Flores 6–7 lin. longi. Vexillum oculo nudo glabrum etsi sub lente pubes sericea tenuissima sæpe apparet, basi auriculis inflexis appendiculatum. Stamina more *Lonchocarpi* monadelpha. Ovarium villosulum, biovulatum. Legumen vulgo 1½–2 poll. longum, 1 poll. latum, oblique v. interdum subfalcato-oblongum, stylo acutatum v. obtusum, basi acutiusculum subsessile.

Hab. Throughout Southern India, from Ceylon, the Peninsula, and Bombay, to Pegu and Malacca, very common all over the coast, and in the plains extending northward to the foot of the hills. Abundant in the Indian Archipelago, extending northward to South China and Loo Choo, and eastward to the Feejees, Timor, and Tropical Australia.

The other species formerly considered as *Pongamias* are now referred chiefly to *Derris* and to *Millettia.*

XVII. Piscidia, *Linn.*

Flos *Lonchocarpi.* Legumen lineare, plano-compressum, indehiscens, polyspermum, longitudinaliter 4-alatum, *i. e.* sutura utraque utroque latere aucta ala lata membranacea transverse venosa.

Species unica.

P. erythrina, *Linn., DC. Prod.* ii. p. 267; *P. Carthagensis,* Jacq., Linn., DC. *l. c.* Arbor, foliis alternis pinnatis exstipellatis. Ramuli et petioli tomentoso-puberuli. Foliola 7–11, opposita cum impari distante, ovalia obovalia v. late oblonga, obtusa v. breviter acuminata, demum coriacea, supra glabra, subtus elevato-pennivenia et plus minus tomentella rufescentia v. pallentia, 2–4 poll. longa, petiolulo 2–3-lineari. Paniculæ laterales, sub anthesi aphyllæ, cano-sericeæ, nunc ovatæ densifloræ, vix 3-pollicares, nunc elongato-thyrsoideæ ½–1-pedales. Ramuli (fasciculorum rhaches elongatæ) breves, 3–12-flori. Pedicelli sparsi, 2–3 lin. longi. Flores 7–8 lin., albo et sanguineo mixti. Calyx cano-sericeus, dente infimo late triangulari, superioribus latis obtusissimis. Vexillum extus cano-sericeum, ungue calycem subæquante. Ovarium sericeum, ovulis 10–12. Legumen 2–4-pollicare, cano-tomentellum v. glabrescens, parte seminifera 3–4 lin. lata, inter semina subconstrictum; alæ omnes 6–10 lin. latæ, rigidule membranaceæ, venis transversis crebris parallelis lineatæ. Variat pube paginæ inferioris foliolorum tenui canescente v. laxa subvelutina et nonnunquam rufescente; forma et numero foliolorum; inflorescentia brevi v. elongata, leguminis alis continuis v. (ovulis hinc inde abortientibus) inter semina subinterruptis, &c.

Hab. West Indies: Jamaica, Guadaloupe, St. Vincent's, St. Lucia, &c.; also in the Bahamas, *Herb. Hook.*; and Florida, *Rügel,* n. 155.

In flower, this plant is very near *Lonchocarpus,* and has much the aspect of the *L. Guatemalensis,* except in inflorescence, which is nearer that of the paniculate series of *Lonchocarpi.*

The winged-podded *Sesbanias* or *Daubentonias* have been occasionally published as *Piscidias.*

XVIII. Müllera, *Linn.*

Coublandia, *Aubl.*; Cyanobotrys, *Zucc.*

Flos *Lonchocarpi*. Legumen crassum, carnoso-suberosum, transverse subteres, indehiscens, inter semina sæpius constrictum et intus isthmis solidis interceptum. Semina ovoideo-subglobosa, vix compressa, hilo laterali.—Arbores habitu omnino *Lonchocarpi*, foliolis sæpius pellucido-punctatis.

1. M. moniliformis (*Linn., DC. Prod.* ii. p. 259), glabra, foliolis 5 parce pellucido-punctatis, pedicellis geminis, legumine moniliformi polyspermo v. abortu monospermo subgloboso.—Miq. Stirp. Surin. t. 4; *Coublandia frutescens*, Aubl. Pl. Gui. t. 356, et fr. in t. 300 sub *Deguelicæ* pictus.—Habitus, folia et inflorescentia *Lonchocarpi virgilioidis*. Foliola 2–3-pollicaria, punctis pellucidis iis *L. violacei* similibus notata, sed rarioribus et nonnunquam fere evanidis. Flores circa 9 lin. longi, pedicellis gracilibus 2–3 lin. longis subsessilibus. Legumen nunc subglobosum ¾–1 poll. diametro, nunc quasi articulatum, monilibus globosis isthmis angustissimis separatis.

Hab. Tropical America, North Brazil; Cayenne, *Aublet, Martin*; Surinam, *Hostmann*, n. 350, *Leschenault*, &c.; British Guiana, *Rob. Schomburgk*, 2nd coll. n. 156, *Rich. Schomburgk*, n. 132, *Parker*, &c.; St. Vincent's, *Anderson*.

2. M. mexicana (glabra, foliolis 5–11 ovatis oblongisve acuminatis crebre pellucido-punctatis, pedicellis bifloris), legumine tereti-subcompresso subtoruloso. — *Cyanobotrys mexicana*, Zucc. Pl. Nov. fasc. v. p. 30. t. 5.—Legumen 1–2-pollicare, 1–3-spermum, glabrescens, læve, suturis non prominentibus.

Hab. Mexico, *Herb. Zuccarini*.

The flowering specimen which I examined in Zuccarini's herbarium was so precisely in every respect like some of those of *Lonchocarpus violaceus*, that I could scarcely believe them distinct. The staminal tube was quite entire, the upper stamen free at the base only, as in *Lonchocarpus*; the only fruit in the collection was detached, and evidently not gathered at the same time; and I might have suspected that they had been mismatched, but that Zuccarini had raised the plant, in the Munich garden, from the seeds.

XIX. Euchresta, *Benn.*

Calyx campanulatus, postice gibbus, breviter 5-dentatus. Vexillum angustum. Carinæ petala apice dorso cohærentia. Stamina 10, vexillari soluto, cæteris connatis (at facile solvendis). Ovarium stipitatum, 1–2-ovulatum. Legumen stipitatum, ovoideum, chartaceum, fragile, indehiscens. Semen unicum, pendulum. Embryo rectus.

Species unica.

E. Horsfieldii, *Benn. Pl. Jav. Rar.* p. 148, t. 31; Andira Horsfieldii, *Lesch., DC. Prod.* ii. p. 476. Frutex glaber v. vix in inflorescentia minute puberulus. Folia alterna, pinnata. Foliola 3–5, opposita cum impari distante, brevissime petiolulata, exstipellata, oblongo-elliptica, acuminata, 3–6-pollicaria, crassiuscula at vix coriacea, pallide virentia. Racemi axillares, simplices. Pedicelli solitarii, sparsi, 2–3 lin. longi. Bracteæ parvæ, angustæ. Bracteolæ inconspicuæ. Calyx 3½ lin. longus, uti petala candidus, consistentia cerina. Petala calycem duplo superantia, æquilonga et omnia anguste oblonga. Vexillum complicatum, basi in unguem longum angustatum. Ovarium longissime stipitatum, oblongum, glabrum. Stylus incurvus, filiformis, stigmate parvo. Legumen "magnitudine *Pruni domestici sylvestris,* in tres laminas solubile, quarum exterior violascenti-nigra glaberrima nitida tenuis, intermedia (post macerationem) fungoso-cellulosa, intima lævigata tenuissima."

Hab. Java, *Leschenault, Horsfield, Junghuhn,* &c.; also in North-East Formosa, *Wilford.*

XX. Andira, *Lam.*

Calyx late campanulatus v. subturbinatus, truncatus v. breviter 5-dentatus. Petala carinalia libera, dorso imbricantia. Stamen vexillare liberum, cætera connata, v. rarius omnia connata vagina latere superiore fissa. Antheræ versatiles. Ovarium stipitatum v. rarius sessile, 2–4-rarius 1-ovulatum. Legumen drupaceum, ovoideum v. obovoideum, indehiscens, semine unico pendulo. Embryo rectus.—Arbores austro-Americanæ. Folia alterna, imparipinnata. Foliola opposita v. rarius alterna, sæpe stipellata. Flores paniculati, rosei v. violacei, suaveolentes, sessiles v. breviter pedicellati. Legumina in speciebus nonnullis in sicco magnitudine nucis juglandis, in aliis duplo majora dicuntur; quæ vidi verisimiliter exsiccatione contracta.

Sect. 1. Aristobulia. Vexilli unguis calyce brevior. Stamina monadelpha. Ovarium subsessile, pubescens. (Legumen ignotum. An hujus generis?)

1. A. amazonum. (Brasilia sept., Guiana.)

Sect. 2. Lumbricidia. Vexilli unguis calycem subæquans v. superans. Stamina diadelpha ½. Ovarium distincte v. longe stipitatum.

* *Ovario pubescente v. villoso.* (Species 6 priores inter se arcte affines.)

2. A. stipulacea. (Brasilia.)
3. A. frondosa. (Brasilia.)
4. A. anthelmintica. (Brasilia.)
5. A. Pisonis. (Brasilia.)
6. A. fraxinifolia. (Brasilia.)
7. A. parvifolia. (Brasilia.)
8. A. cujabensis. (Brasilia.)
9. A. cubensis. (Cuba.)

** *Ovario glabro v. pilis paucis ciliato.* (Species inter se arcte affines.)

10. A. vermifuga. (Brasilia.)
11. A. paniculata. (Brasilia.)
12. A. retusa. (Brasilia sept., Guiana.)
13. A. laurifolia. (Brasilia.)
14. A. humilis. (Brasilia.)
15. A. nitida. (Brasilia.)
16. A. inermis. (America calidior, Africa occid.)
17. A. sapindoides. (Ind. occid.)

Sect. 1. Aristobulia.

1. A.? amazonum (*Mart. Benth. in Ann. Mus. Vind.* ii. p. 107, *et in Mart. Fl. Bras. Leg.* ined.), foliolis 9–15 alternis oblongis nitidis glabris v. subtus tenuissime puberulis, panicula simplici, floribus magnis, staminibus monadelphis, ovario subsessili sericeo.—*A. bracteosa*, Benth. in Ann. Mus. Vind. ii. p. 107; *Ormosia pacimonensis*, Spruce, Pl. exs. n. 3365.—Folia ampla, foliolis 3–4-pollicaribus. Panicula pedalis v. longior, subcanescens. Bracteæ quam in sequentibus multo majores, concavæ. Flores iis *Hymenolobii* subsimiles, 1–1¼-pollicares.

Hab. North Brazil, also Cayenne, *Martin*; and Venezuela, on the Pacimone River, *Spruce*, n. 3345.

Sect. 2. Lumbricidia.

2. A. stipulacea (*Benth. in Ann. Mus. Vind.* ii. p. 107, *et in Mart. Fl. Bras. Leg.* ined.), stipulis amplis persistentibus, foliolis 11–15 obovali-oblongis subtus puberulis, panicula puberula, bracteolis minutis caducissimis, ovario pubescente.—*Lumbricidia legalis*, Vell. Fl. Flum. vii. t. 105 (ex ic.).—Stipulæ subpollicares, latæ, cartilagineæ. Folia ampla, foliolis 3–4-pollicaribus, sæpius stipellatis. Panicula floribunda. Flores circa 8 lin. longi. Ovula 4.

Hab. Brazil, near Rio Janeiro.

β? Bahiensis, stipulis minoribus.

Hab. Brazil, near Bahia (*Blanchet*, n. 607).

3. A. frondosa (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 108, *et in Mart. Fl. Bras. Leg.* ined.), stipulis amplis persistentibus, foliolis 11–15 ovalibus subtus puberulis, panicula rufo-villosa, bracteolis lanceolatis calycis dimidium superantibus, ovario pubescente.—Foliola quam in præcedente latiora et magis coriacea. Flores majores. Ovula 4. An *A. stipulaceæ* varietas?

Hab. Brazil, on the sea-coast near Rio Janeiro.

4. A. anthelmintica (*Benth. in Ann. Mus. Vind.* ii. p. 108, *et in Mart. Fl. Bras. Leg.* ined.), stipulis lanceolatis caducis, foliolis 9–13 obovali-ellipticis oblongisve demum coriaceis supra glabris subtus molliter pubescentibus, paniculis brevibus rufo-tomentosis, bracteolis

minutis caducissimis, ovario pubescente.—*Lumbricidia anthelmia*, Vell. Fl. Flum. vii. t. 104.—Ab *A. stipulacea* differt pube, stipulis, floribus paullo minoribus, dentibus calycinis evidentioribus. Foliola 2½–3-pollicaria, in forma normali pleraque acuminata. Flores circa 7 lin. longi. Ovula 4.

Hab. Brazil, near Rio Janeiro.

β, ormosioides, foliolis plerisque obtusissimis retusisve.—*A. ormosioides*, Benth. in Ann. Mus. Vind. ii. p. 108.

Hab. Brazil, prov. Mattogrosso.

5. A. Pisonis (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 108, *et in Mart. Fl. Bras. Leg.* ined.), stipulis minutis v. nullis, foliolis 5–9 ovalibus oblongisve coriaceis supra glabris subtus rufo-sericeis, panicula ferrugineo-tomentosa, bracteolis minutis caducissimis, ovario villoso.—Foliola coriacea *A. anthelminticæ* sed minora et pauciora. Ramuli floridi tenues ut in sequente, nec incrassati ut in præcedentibus. Flores *A. anthelminticæ*.

Hab. Brazil, prov. Minas Geraes and Bahia (*Blanchet*, n. 3672).

6. A. fraxinifolia (*Benth. in Ann. Mus. Vind.* ii. p. 108, *et in Mart. Fl. Bras. Leg.* ined.), stipulis minimis v. nullis, foliolis 9–11 oblongis acuminatis non coriaceis subtus pubescentibus v. demum glabratis, panicula foliis breviore laxe tomentella, bracteis bracteolisque minutis v. nullis, ovario villoso, stipite calyce multo breviore.—*A. rosea*, Mart., Benth. in Ann. Mus. Vind. ii. p. 108.—A præcedentibus distinguitur ramis floridis tenuioribus, foliolis minoribus tenuioribus, floribus minoribus. Foliola pleraque 2–3-pollicaria, opaca et sæpe pallentia, subtus insigniter venosa. Flores vix 6 lineas excedunt. Ovula 4.

Hab. Brazil, prov. Rio Janeiro, Minas Geraes, and San Paolo, apparently frequent.

7. A. parvifolia (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 108, *et in Mart. Fl. Bras. Leg.* ined.), stipulis subulatis v. nullis, foliolis sub-9 parvis ovalibus obtusis non coriaceis subtus pubescentibus v. demum glabratis, panicula brevi laxe tomentella, ovario villoso, stipite calyce vix breviore.—Foliola vix pollicaria et minime acuminata, cæterum *A. fraxinifoliæ* valde affinia.

Hab. Brazil, prov. Minas Geraes.

8. A.? Cujabensis (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 5–9 ovatis basi subcordatis coriaceis supra glabris nitidis subtus laxe pubescentibus, paniculis ramosissimis rhachi tomentosa, floribus parvis confertis, calyce glabrescente, ovario pubescente biovulato.—Foliola pleraque 1½–2 poll. longa, 1–1½ poll. lata. Panicula semipedalis, floribunda, floribus confertis vix 3 lin. longis.

Hab. Brazil, prov. Mattogrosso and Goyaz (*Gardner*, n. 3654).

The pod in this and the following species not having been seen, the genus must be considered as in some measure doubtful.

9. A.? CUBENSIS, sp. n., foliolis 9–13 ovalibus oblongisve obtusis v. breviter acuminatis coriaceis nitidis glabris, panicula floribunda fusco-tomentosa, floribus parvis sessilibus, calyce tomentoso, ovario breviter stipitato villosulo uniovulato.—Arbor primo intuitu formis nonnullis latifoliis *A. inermis* subsimilis, sed flores minores et ovarium distinctissimum. Flores circa 3 lin. longi, dense conferti, violacei. Calyx fusco-villosus, basi obtusus. Petala et stamina omnino generis. Ovarii stipes calyce subdimidio brevior.

Hab. Cuba, *Linden*, n. 2160.

10. A. VERMIFUGA (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 108, *et in Mart. Fl. Bras. Leg.* ined.), foliolis 9–11 subsessilibus late ovalibus obtusis retusisve basi subcordatis coriaceis subtus pubescentibus, panicula ampla, calycibus turbinatis tomentosis, ovario glabro.—*Geoffroya vermifuga* et *G. spinulosa*, Mart. Reise, p. 788; *Andira spinulosa*, Mart., Benth. in Ann. Mus. Vind. ii. p. 108.—Folia ampla, foliolis crassis 3–4-pollicaribus, petiolulo brevissimo. Flores 7–8 lin. longi fere *A. anthelminticæ*, sed ovarium glabrum. Ovula 4.

Hab. Brazil, prov. Minas Geraes and Mattogrosso.

The relative dilatation of the petiole and prominence of the stipellæ, upon which the two supposed species were originally founded, prove to be very variable.

11. A. PANICULATA (*Benth. in Ann. Mus. Vind.* ii. p. 109, *et in Mart. Fl. Bras. Leg.* ined.), foliolis 11–13 petiolulatis oblongis v. ovali-oblongis obtusis retusisve vix coriaceis basi rotundatis cuneatisve supra puberulis subtus sericeo-puberulis villosisve, panicula ampla, calyce tomentoso basi acutato, ovario glabro.—Flores fere *A. vermifugæ*, folia iis *A. laurifoliæ* similiora sed foliola minus coriacea et utrinque pubescentia, pleraque 2–3 poll. longa, 1 poll. lata.

Hab. Brazil, prov. Goyaz and Ceara (*Gardner*, n. 1538).

12. A. RETUSA (*H. B. K. Nov. Gen. et Sp.* vi. p. 385 in adnot.), foliolis 9–11 petiolulatis oblongis obovatisve obtusis retusisve basi rotundatis coriaceis supra glabris nitidis subtus puberulis, panicula laxa, calyce tomentoso basi acutato, ovario glabro.—*Geoffroya retusa*, Lam. Illustr. t. 602, f. 2, Poir. Dict. viii. p. 182; *Geoffroya pubescens*, Rich. in Act. Soc. Hist. Nat. Par. p. 121.—Foliola vulgo 3-pollicaria, supra medium latiora, subtus quam in sequente magis reticulata et plus minus pubescentia. Flores quam in præcedentibus minores, majores tamen quam in *A. inermi*, circa 6 lin. longi.

Hab. Tropical America: Cayenne, *Martin* and others; British Guiana, *Rob. Schomburgk*, 2nd coll. n. 512; *Rich. Schomburgk*, n. 780.

β, *oblonga*, foliolis apice minus dilatatis, nonnunquam brevissime et obtuse subacuminatis.—*A. oblonga*, Benth. in Pl. Spruce exs.

Hab. Tropical America: North Brazil, *Spruce*; prov. Piauhy, *Gardner*, n. 2552; British Guiana, *Rob. Schomburgk*, 1st coll. n. 587, 2nd coll. n. 234, *Rich. Schomburgk*, n. 327.

In determining Schomburgk's plants I had formerly considered this as the same as the southern *A. laurifolia*; and afterwards having many more specimens before me from various sources, finding the leaflets always pubescent underneath, more reticulate, and rather differently shaped, I thought it might be a distinct species, which I named *A. oblonga* in Spruce's distribution. I now see, however, that it passes too gradually into the old *A. retusa* to be considered as more than a variety of it.

13. A. LAURIFOLIA (*Benth. in Ann. Mus. Vind.* ii. p. 109, *et in Mart. Fl. Bras. Leg.* ined.), foliolis 9–17 oblongis v. ovato-oblongis obtusis retusisve basi rotundatis petiolulatis coriaceis glabris supra nitidis, panicula laxa, calyce tomentoso basi acutato, ovario glabro.—Foliola 3–4-pollicaria, fere a basi apicem versus leviter angustata, at apice semper obtusa et basi rotundata, rigide coriacea. Panicula quam in *A. inermi* laxior, floribus majoribus, vulgo circa 6 lin. longis, calyce 3 lin. longo, magnitudine tamen interdum variant.

Hab. Brazil, common in Minas Geraes, also prov. Pernambuco (*Gardner*, n. 2816).

This may possibly prove to be a variety of *A. retusa*.

14. A. HUMILIS (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 109, *et in Mart. Fl. Bras. Leg.* ined.), foliolis 9–11 (rarissime 7 v. 13) oblongis obtusis retusisve basi rotundatis petiolulatis coriaceis glabris nitidis, panicula laxa brevi, calyce glabrato basi acutiusculo, ovario glabro.—*A. pauciflora*, Benth. in Ann. Mus. Vind. *l.c.*

Hab. Brazil, prov. Minas Geraes.

Perhaps a variety of *A. laurifolia*, but the almost or quite glabrous dark-coloured calyces give it a very different aspect.

15. A. NITIDA (*Mart., Benth. in Ann. Mus. Vind.* ii. p. 109, *et in Mart. Fl. Bras. Leg.* ined.), foliolis 5–9 ovali-oblongis acuminatis glabris coriaceis nitidis, panicula laxa, calyce brevi glabro basi obtusiusculo, ovario glabro.

Hab. Brazil, near Bahia.

Differs from *A. inermis* as the *A. humilis* from the *A. laurifolia*, by the glabrous calyx. It is said, also, to be only a shrub, or very small tree.

16. A. INERMIS (*H.B. K. Nov. Gen. et Sp.* vi. p. 385 in adnot), foliolis 9–13 oblongis acuminatis glabris coriaceis supra nitidulis, panicula floribunda, floribus subsessilibus, calyce brevi tomentoso basi obtuso, ovario glabro v. vix ciliato.—*Geoffroya inermis*, Linn.; *Andira racemosa*, Lam. Dict. i. p. 171, et Illustr. t. 604, f. 1; *A. grandiflora*, Guill. et Perr. Fl. Seneg. i. p. 254; *A. acuminata*, Benth. in Ann. Mus. Vind. ii. p. 109.—Arbor procerissima, ramis frondosis, pulcherrime florens. Foliola pleraque 3 poll. longa, 1 poll. lata, maxima 4-pollicaria, terminale cujusve folii sæpe brevius et latius, concoloria, costa subtus

prominente, venis tenuibus. Paniculæ pyramidatæ, 6–10-pollicares, supra folia ultima sessiles. Flores rosei, variant a 5 ad 6 lineas longi. Calyx circa 2 lin. Ovarii stipes e calyce exsertus. Ovula 3–4, sed jam sub anthesi 2 v. 3 minima sunt et subabortiva.

Hab. Tropical America and West Tropical Africa, very abundant in the West Indies, Central America, Guiana, Venezuela, north Brazil, and eastern Peru (Mexico, *Jurgensen*, n. 64; Panama, *Cuming*, n. 1625; Trinidad, *Sieber*, n. 47; Surinam, *Hostmann*, n. 461 & 669; Cuyaba, *Mart. Hb. Fl. Bras.* n. 1157; Tarapoto, *Spruce*, n. 4115, etc.).

The Brazilian and West African specimens are generally rather larger-flowered and stiffer-leaved than those from Guiana, the West Indies, and Central America; but in the very large number of specimens from numerous collectors which I have compared, I can find no tangible characters nor constant size in the flowers to separate them even into marked varieties.

β, Riedeli, Benth. in Mart. Fl. Bras. Leg. ined., foliolis subtus puberulis.

Hab. On the Rio Coxim, in Brazil, *Riedel*. The two specimens are very poor and unsatisfactory.

17? A. SAPINDOIDES, foliolis 9–13 oblongis acuminatis glabris coriaceis supra nitidulis, panicula laxa, floribus distincte pedicellatis, calyce brevi tomentoso basi acutiusculo, ovario glabro v. leviter ciliato.—*Pterocarpus sapindoides*, DC. Prod. ii. p. 419.

Hab. West Indies; Dominica, *Herb. DC.*, *Imray*; Antigua, *Wullschnagel*.

I have considerable doubts whether this may not prove to be only a well-marked variety of *A. inermis*; but the flowers are considerably larger, distinctly pedicellate with a differently shaped calyx, and I have as yet seen no intermediate specimens. Dr. Grisebach may probably be enabled, from better materials, to clear up these doubts, in the 'West Indian Flora,' which he is preparing with so much care and ability.

XXI. GEOFFROYA.

Calyx turbinato-campanulatus, incurvus, distincte 5-dentatus (v. semi-4-fidus?) dentibus summis alte connatis. Petala carinalia libera, dorso imbricantia. Stamina monadelpha v. vexillari soluto diadelpha, vagina latere superiore fissa. Antheræ versatiles. Ovarium sessile v. breviter stipitatum, 3–4-ovulatum. Legumen drupaceum, ovoideum v. obovoideum (indehiscens?), semine unico pendulo. Embryo rectus.—Arbores austro-Americanæ. Folia alterna, imparipinnata. Foliola alterna v. subopposita, stipellis raro conspicuis. Flores simpliciter racemosi, flavi, sæpissime fœtidi.

1. G. SPINOSA (*Linn.*, *DC. Prod.* ii. p. 476 excl. syn. *Marcgr.*), trunco spinis subulatis armato, foliolis 13–15 oblongis obtusis.—"Flores pedicellati, simpliciter racemosi, sordide flavescentes, fœtidi."

Hab. New Granada, near Carthagena, *Jacquin*.

I have never seen this plant; nor can I hear of the existence of any specimen in England, Paris, or Geneva.

2. G. Sieberi, sp. n., foliolis 9–11 ovalibus oblongisve obtusis retusisve glabris subtus pallidis, racemis fusco-tomentoso-pubescentibus, vexillo glabro, ovario brevissime stipitato pubescente.—Ramuli et folia glabra. Petioli communes 4–6-pollicares. Foliola 1½–2 poll. longa, 1–1¼ poll. lata, apice basique rotundata et summo apice sæpius emarginata. Pubes racemorum densa et minus appressa quam in *G. discolore*. Flores 10–11 lin. longi. Vexillum ample orbiculatum, basi in unguem calyce multo breviorem contractum, glaberrimum. Alæ et carina breviores. Stamina monadelpha. Ovarii stipes distinctus etsi brevis. Ovula 4.

Hab. Trinidad, *Sieber*, n. 313.

I have only seen a single specimen in DeCandolle's herbarium.

3. G. discolor (*Benth. in Hook. Journ. Bot.* ii. p. 69), foliolis 7–9 oblique ovatis oblongisve acuminatis v. obtusiusculis glabris subtus canescentibus, racemis ferrugineo-tomentosis, vexillo pubescente, ovario sessili tomentoso.—Ramuli et petioli juniores ferruginei, adulti glabrati. Folia adulta pedalia, foliolis 2–3-pollicaribus basi sæpius valde obliquis. Racemi et calyces tomento brevi denso ferruginei. Bracteæ ovatæ, concavæ.

Hab. Cayenne, *Martin*.

4. G. superba (*Humb. et Bonpl. Pl. Æq.* ii. p. 69, t. 100), foliolis 13–25 obovali-oblongis obtusis retusisve pilosulis glabratisve subtus lineato-venosis, racemis tomentellis, vexillo glabro, ovario sessili tomentoso.—*G. Bredemeyeri*, H. B. K. Nov. Gen. et Sp. vi. p. 379; *Robinia striata*, Willd. Spec. iii. p. 1132.—A præcedentibus facile distincta foliolis parvis numerosis lineatis, vulgo circiter 15 in folio 3–4-pollicari, singula 8–10 lin. longa v. raro pollice paullo longiora. Racemi folia subæquantes. Bracteæ ovatæ, membranaceæ, caducissimæ. Flores circa 5 lin. longi, lutei, plus minus graveolentes, nunc fœtidissimi. Ovula 4. Legumen omnino *Andiræ*, magnitudine nucis juglandis.

Hab. Tropical America: Brazil, frequent in the provinces of Bahia, Pernambuco, Alagoas, and Ceara (*Blanchet*, n. 2650; *Gardner*, n. 964, 1415, 1911), and in Venezuela.

XXII. Dipteryx.

Coumarouna et Taralea, *Aubl.*

Calycis tubus brevis; laciniæ 2 summæ maximæ, alæformes, crassiusculæ, florem in alabastro includentes, 3 inferiores in labium inferius minimum coalitæ. Petala ad marginem tubi inserta. Vexillum latum, emarginato-bifidum. Alæ apice oblique bifidæ. Petala carinalia libera v. dorso apice leviter cohærentia. Stamina 10, monadelpha, vagina latere superiore fissa.

Antheræ versatiles, alternæ sæpe minores v. nonnullæ cassæ v. abortientes. Ovarium stipitatum, ovulo unico pendulo. Legumen drupaceum, ovoideum, indehiscens, monospermum. Semen pendulum, embryone fere recto.—Arbores austro-Americanæ. Foliola alterna v. opposita, subabrupte pinnata. Foliola opposita v. alterna, coriacea. Paniculæ terminales, floribundæ. Flores violacei v. rosei.

Sect. 1. Coumarouna. Folia alterna. Ovarium glabrum, basi longe attenuatum.

1. D. rosea. (Brasilia sept.)
2. D. odorata. (Brasilia sept., Guiana.)
3. D. tetraphylla. (Brasilia sept.)
4. D. alata. (Brasilia.)

Sect. 2. Taralea. Folia opposita v. rarius alterna. Ovarium tomentosum, brevissime stipitatum, superne in stylum attenuatum.

5. D. oppositifolia. (America trop.)
6. D. nudipes. (Brasilia sept.)
7. D. reticulata. (Guiana.)
8. D. crassifolia. (Guiana.)

Sect. 1. Coumarouna.

1. D. rosea (*Spruce, Benth. in Mart. Fl. Bras. Leg.* ined.), foliis alternis, petiolo alato vix acuminato, foliolis 6–8 alternis ample oblongis impunctatis, panicula calycibusque tomentellis, floribus magnis, antheris omnibus fertilibus, ovario glabro.—A *D. odorata* differt imprimis floribus fere duplo majoribus. Calyx crassus, lobis summis 10 lin. longis 4 lin. latis.

Hab. North Brazil (*Spruce*, n. 2096).

2. D. odorata (*Willd., DC. Prod.* ii. p. 477), foliis alternis, petiolo alato longe acuminato, foliolis 6–8 alternis amplis oblongis impunctatis, panicula calycibusque rufo-tomentellis, antheris fertilibus 5–8 (rarius 10?), ovario glabro.—*Coumarouna odorata,* Aubl. Pl. Gui. ii. p. 740, t. 296.—Petiolus ultra foliola ultima productus in acumen sæpe pollicare. Foliola 5–8-pollicaria. Calycis laciniæ summæ 5 lin. longæ. Petala iis breviora. Legumen ovoideo-oblongum, compressiusculum, 2–2½-pollicare, sarcocarpio filamentoso-carnoso, endocarpio lignoso.

Hab. Cayenne, *Martin*; and North Brazil.

3. D. tetraphylla (*Spruce, Benth. in Mart. Fl. Bras. Leg.* ined.), foliis alternis, petiolo complanato subalato longe acuminato, foliolis 4 oppositis ample oblongis impunctatis, panicula calycibusque rufo-tomentellis, ovario glabro.—*D. odoratæ* valde affinis, differt imprimis foliolis (teste Spruceo, constanter) 4-nis et oppositis.

Hab. North Brazil (*Spruce*, n. 1824).

4. D. ALATA (*Vog. Linnæa,* xi. p. 383), foliis alternis, petiolo alato acuminato, foliolis 6–10 plerisque alternis ovatis oblongisve pellucido-punctatis, panicula tomentella, calycibus glabriusculis pellucido-punctatis, ovario glabro.—*D. pterota,* Mart., Benth. in Ann. Mus. Vind. ii. p. 110.—Foliola 3–5-pollicaria, minus coriacea quam in *D. odorata.* Calycis laciniæ summæ 3 lin. longæ.

Hab. Brazil, prov. Minas Geraes, Goyaz, and Mattogrosso.

Sect. 2. TARALEA.

5. D. OPPOSITIFOLIA (*Willd., DC. Prod.* ii. p. 478), foliis oppositis v. ternatim verticillatis, petiolo applanato aptero, foliolis ovali-oblongis acuminatis tenuiter venosis, panicula calycibusque canescenti-puberulis, ovario tomentoso stipite brevissimo.—*Taralea oppositifolia,* Aubl. Pl. Gui. ii. p. 745, t. 298; *D. applanata,* Benth. in Kew Journ. Bot. ii. p. 234.—Foliola ut in sequentibus sæpius 6; variant in aliis speciminibus 4–6 poll. longa, in aliis 3–4 poll.; venæ tenues, 2–3 majores ad utrumque latus costæ ad basin folii approximatæ. Panicula ampla. Flores violacei v. rosei. Calycis laciniæ summæ 4 lin. longæ. Drupa fere *D. odoratæ.*

Hab. Tropical America: North Brazil, Cayenne, *Martin*; British Guiana, *Rob. Schomburgk,* 1st coll. n. 559.

β, parviflora.—Calycis laciniæ summæ vix 3 lin. longæ.—*D. parviflora,* Spruce Pl. exs.

Hab. North Brazil and Venezuela, on the Rio Uaupès (*Spruce,* n. 2622).

6. D. NUDIPES (*Tul. Arch. Mus. Par.* iv. p. 100), foliis alternis, petiolo aptero applanato, foliolis ovali-oblongis longe acuminatis præter costam subaveniis, panicula canescente, ovario tomentoso, stipite brevissimo.—*Swartzia coriacea,* Desv. in Ann. Sc. Nat. Par. 1 ser. ix. p. 424.—Valde affinis *D. oppositifoliæ,* differt imprimis foliis alternis; foliola etiam magis coriacea. Flores ut in illa variant magnitudine.

Hab. North Brazil, *Herb. Mus. Par.*; on the Rio Negro in North Brazil and Venezuela, *Spruce,* n. 1799 and 3692 (distributed by mistake as the *D. applanata,* which has opposite leaves and belongs to the preceding species).

7. D. RETICULATA (*Benth. in Kew Journ. Bot.* ii. p. 235), foliis oppositis alternisve, petiolo complanato aptero, foliolis ovatis obtusis emarginatis subæquilateris coriaceis glaberrimis eleganter reticulatis, bracteolis coloratis calyce majoribus deciduis, calyce glabriusculo, ovario tomentoso stipite brevissimo.—Foliola 2–2½-pollicaria, 1½ poll. lata, rigidula, subtus pallida, apice nonnunquam brevissime et retuso-acuminata. Calycis laciniæ summæ circa 3 lin. longæ, tenues, coloratæ.

Hab. British Guiana, *Rob. Schomburgk,* 2nd coll. n. 606, *Rich. Schomburgk,* n. 951.

8. D. CRASSIFOLIA (*Benth. in Kew Journ. Bot.* ii. p. 235), foliis oppositis, petiolo anguste marginato, foliolis ovatis v. ovali-oblongis subacuminatis crasse coriaceis supra glabris subtus canescentibus, panicula canescente, calycibus puberulis, ovario tomentoso stipite brevissimo.—Foliola 4–5 poll. longa, 2–3 poll. lata, margine subrecurva. Calycis laciniæ summæ circa 3 lin. longæ. Legumen junius in stipitem brevissimum attenuatum.

Hab. British Guiana, *Rob. Schomburgk* (n. 25 of a small set of almost single specimens gathered in his last expedition).

Species insufficiently known.

D. oleifera, Benth. in Kew Journ. Bot. ii. p. 235, the *Eboe tree* of the Mosquito shore, of which I saw only a fruit and a flower, appeared to be distinct from all the more southern species in the remarkably glandular calyx.

XXIII. PTERODON, *Vog.*

Commilobium, *Benth.*

Flos *Dipterygis* excepto calyce tenuiore, laciniis summis membranaceis subpetaloideis. Antheræ uniformes. Ovarium sæpius stipitatum. Legumen complanato-drupaceum, ovale v. oblongum, subobliquum, sarcocarpio tenui oleaginoso ab endocarpio maturitate secedente; endocarpium medio leviter incrassatum et lignosum, cellulis olea balsamea repletis. Semen *Dipterygis* nisi quod magis compressum.—Arbores austro-Americanæ. Folia alterna abrupte pinnata, petiolo tenui aristula terminato. Foliola subopposita v. alterna, ultimo sæpe pseudoterminali. Flores rosei v. albi in paniculam terminalem dispositi. Species inter se valde affines.

1. P. EMARGINATUS (*Vog. Linnæa,* xi. p. 384), foliolis subseptenis ovali-oblongis emarginatis glabris, calycis alis glabris impunctatis.—Foliola circiter pollicaria.

Hab. Brazil, prov. Minas Geraes, *Sello.*

I have not seen any specimens; but from Vogel's description (unless there is a misprint), it differs from all others in having only 7 leaflets; otherwise I should have considered it the same as the following.

2. P. POLYGALÆFLORUS (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 15–19 ovatis v. ovato-lanceolatis retusis glabris, calycis alis glabris impunctatis.—*Commilobium polygalæflorum*, Benth. in Ann. Mus. Vind. ii. p. 111.—Foliola 9–18 lin. longa, 5–9 lin. lata, chartacea, venis crebris subparallelis. Panicula semipedalis laxe, floribunda. Flores rosei. Calycis alæ (laciniæ summæ) 6 lin. longæ, 4 lin. latæ, petaloideæ. Legumen 2¼ poll. longum, 1¼ poll. latum.

Hab. Brazil, frequent in Minas Geraes, Goyaz, and Piauhy (*Gardner*, n. 2522).

3. P. PUBESCENS (*Benth. in Mart. Fl. Bras. Leg.* ined.), foliolis 20–36 ovato-oblongis subtus petiolis paniculisque pubescentibus,

calycis alis glabris glanduloso-punctatis. — *Commilobium pubescens*, Benth. in Ann. Mus. Vind. ii. p. 111.—Foliola quam in præcedente sæpius angustiora. Flores paullo minores. Legumen minus et angustius.

Hab. Brazil, prov. Minas Geraes, Goyaz, and Mattogrosso, and in Bolivia, prov. Chiquitos, *D'Orbigny*, n. 857.

4. P. ABRUPTUS (*Benth. in Mart. Fl. Bras. Leg.* ined.), pubescens, foliolis 10–14 late ovalibus emarginatis, calycis alis pubescentibus vix punctatis.—*Commilobium abruptum*, Moric. Pl. Nouv. Amer. p. 98, t. 62.—Foliola majora 9 lin. longa, 6 lin. lata, supra pube brevi conspersa, subtus uti rami et paniculæ molliter pubescentia. Flores *P. polygalæflori*.

Hab. Brazil, prov. Bahia (*Blanchet*, n. 2805).

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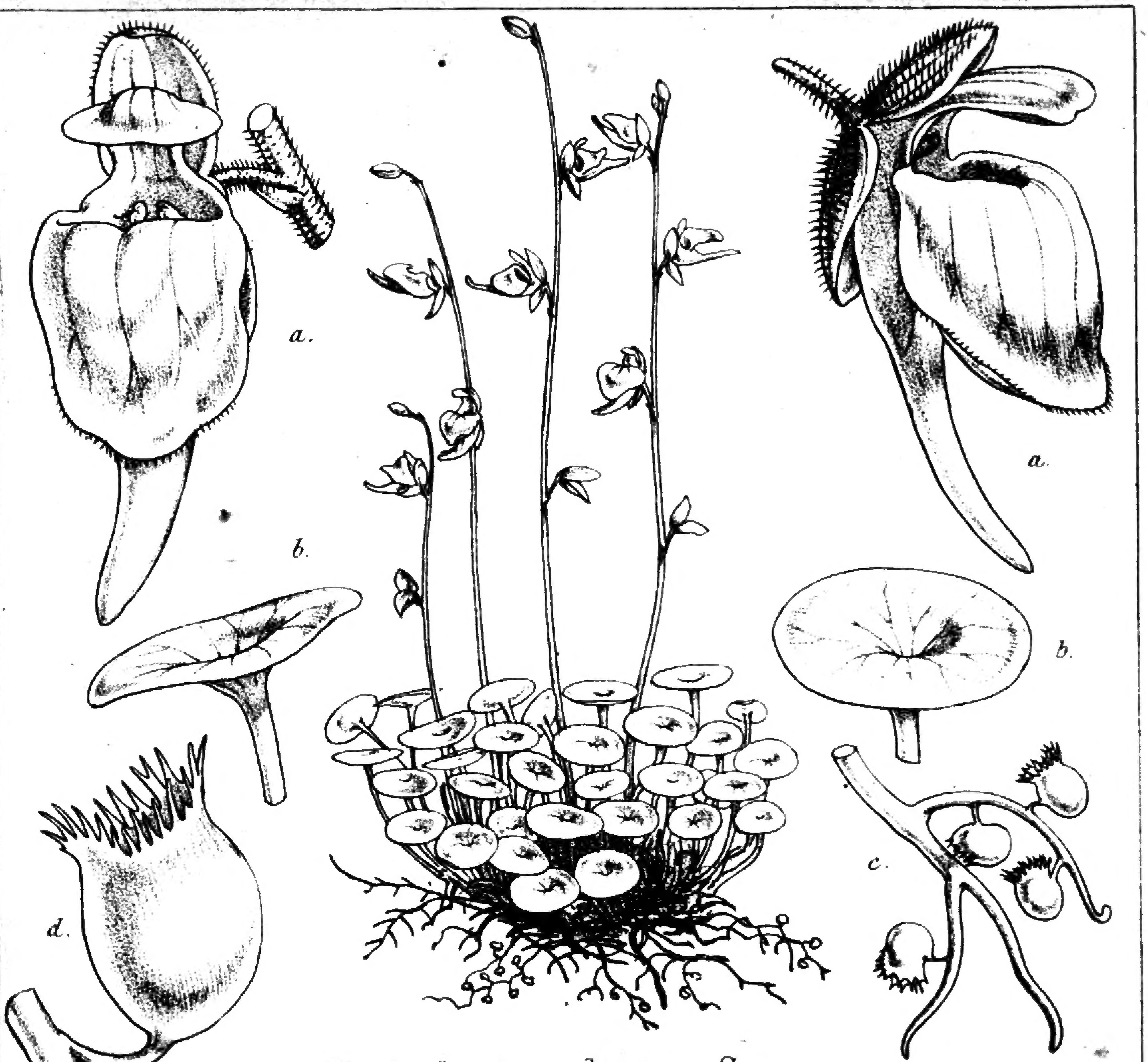

Utricularia peltata, *Spr.*

U. Jamesoniana, *D. Oliv.*